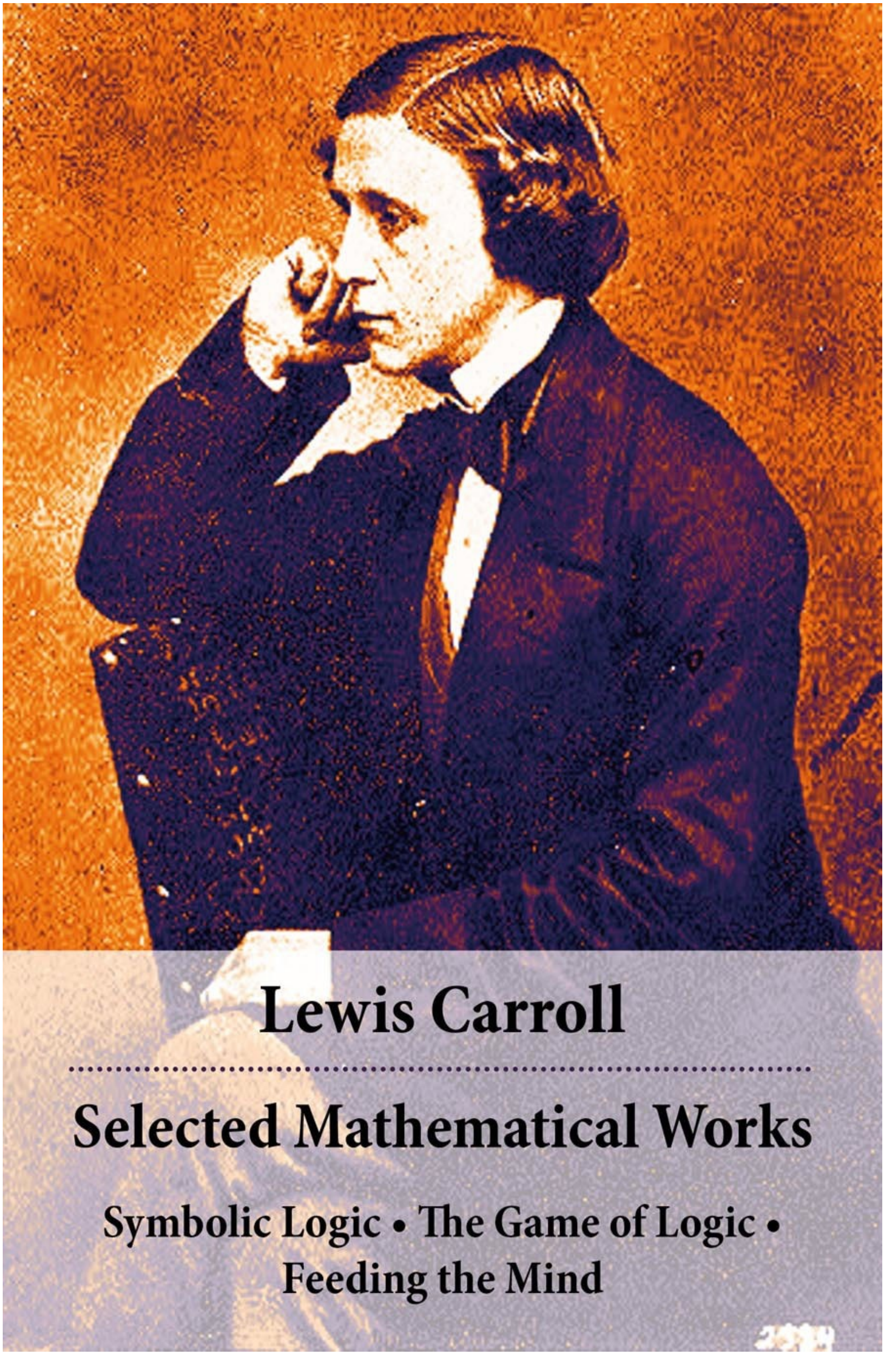
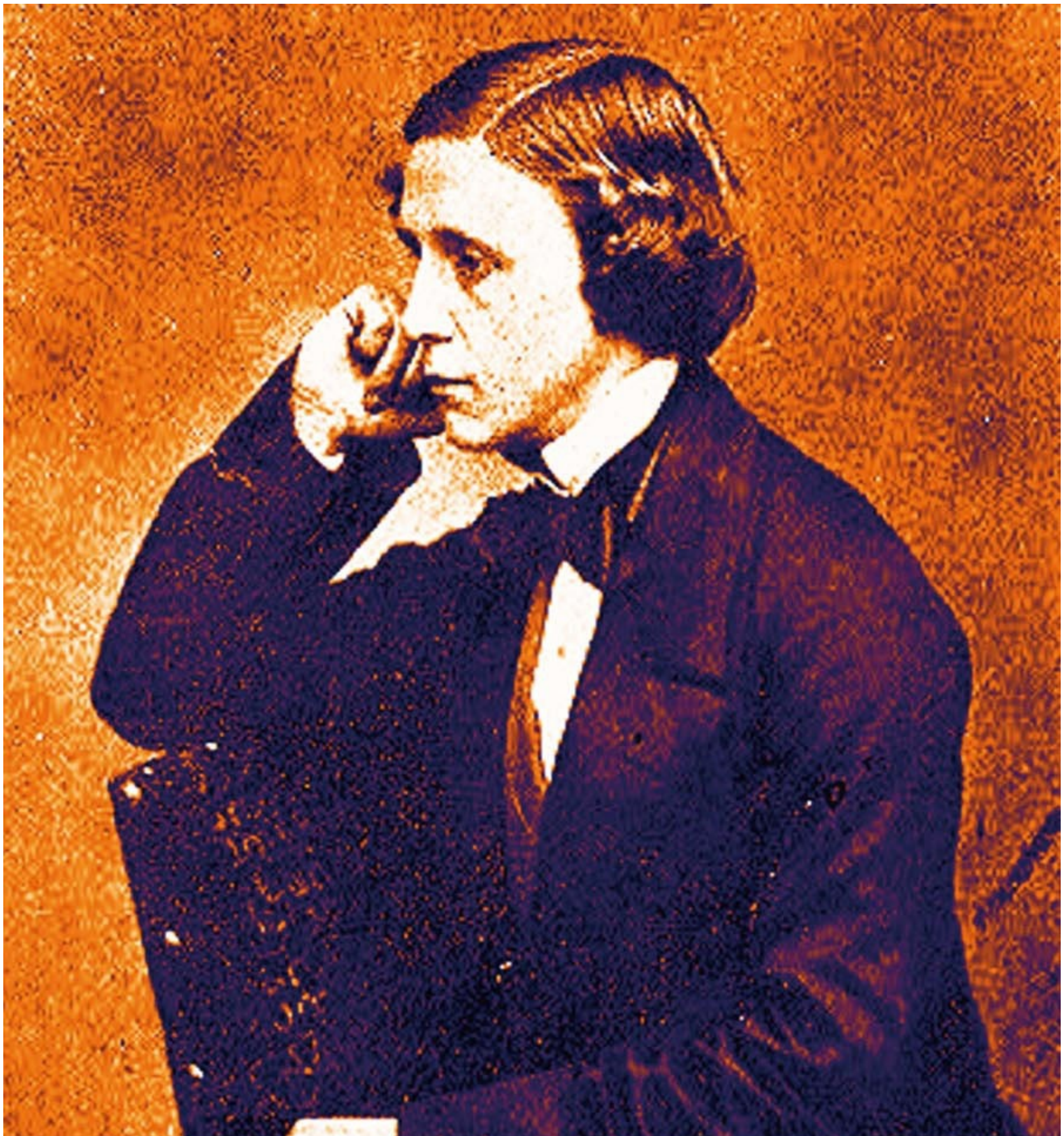


Lewis Carroll

Selected Mathematical Works

Symbolic Logic • The Game of Logic • Feeding the Mind



Lewis Carroll

Selected Mathematical Works

Symbolic Logic • The Game of Logic • Feeding the Mind

Lewis Carroll

Selected Mathematical Works: Symbolic Logic + The Game of Logic + Feeding the Mind

by Charles Lutwidge Dodgson, alias Lewis Carroll

e-artnow, 2021

EAN 4064066444129

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SYMBOLIC LOGIC

Contents

A Syllogism worked out.

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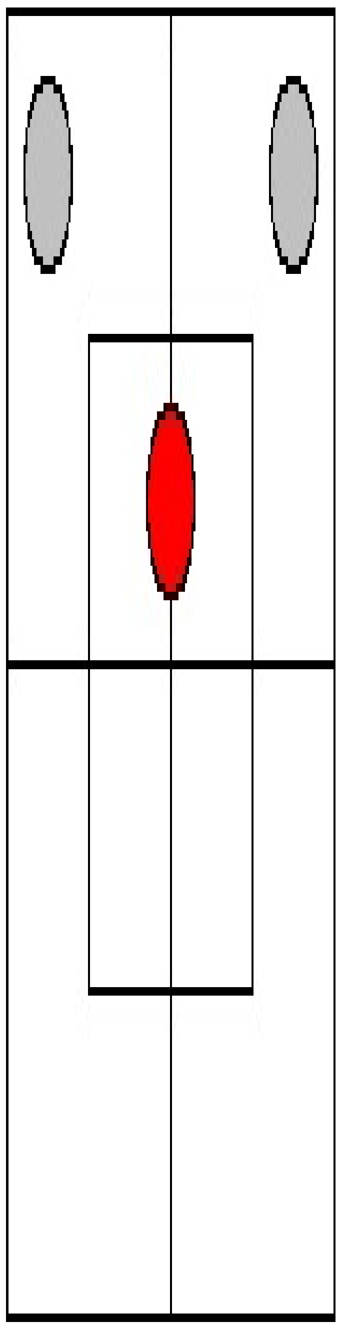
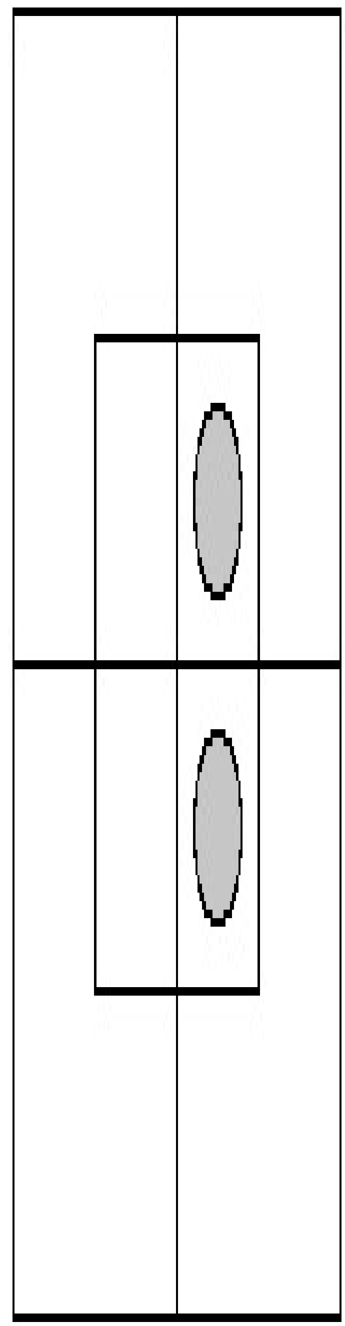
That story of yours, about your once meeting the sea-serpent, always sets me off yawning;

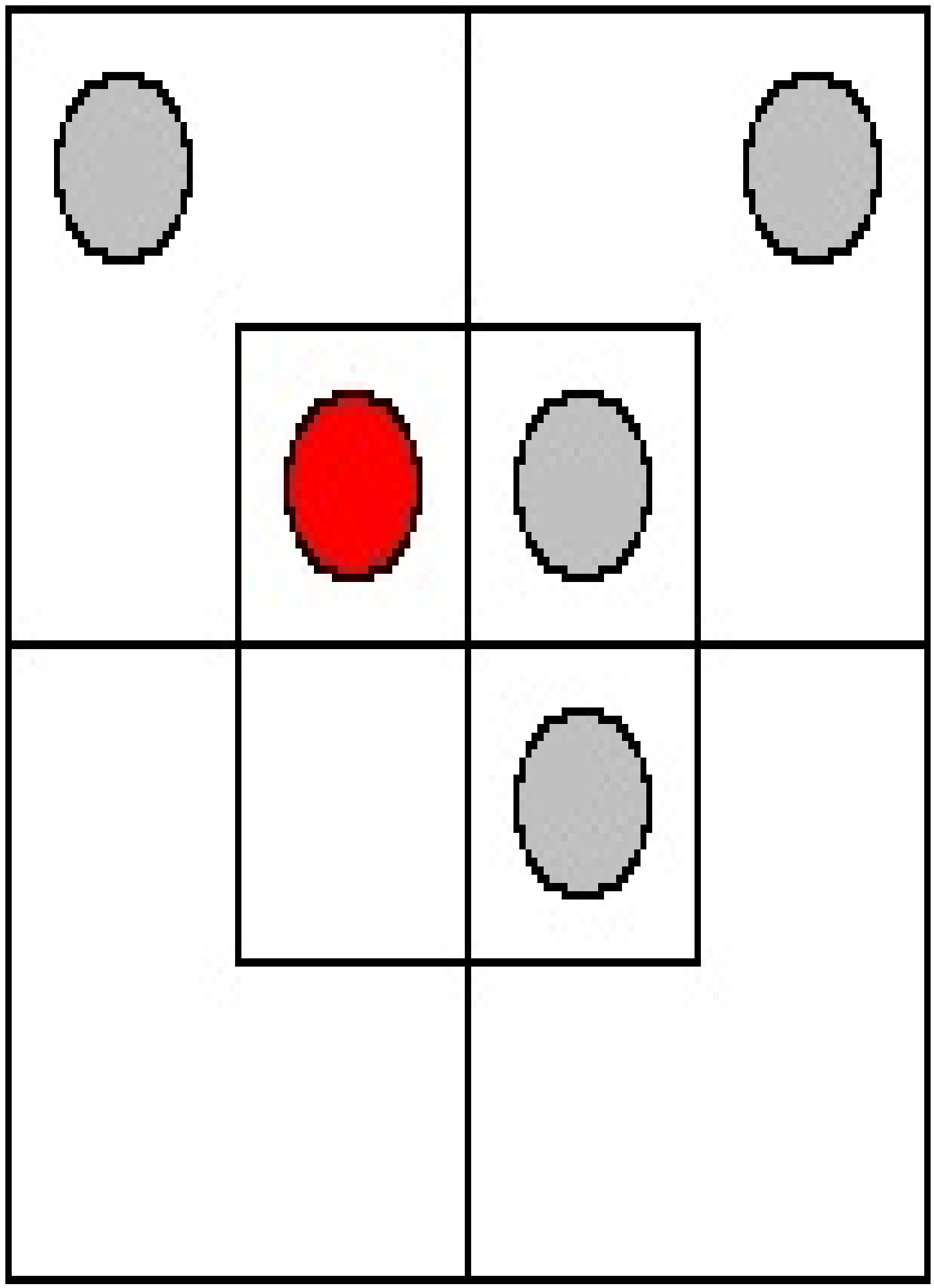
I never yawn, unless when I’m listening to something totally devoid of interest.

The Premisses, separately.

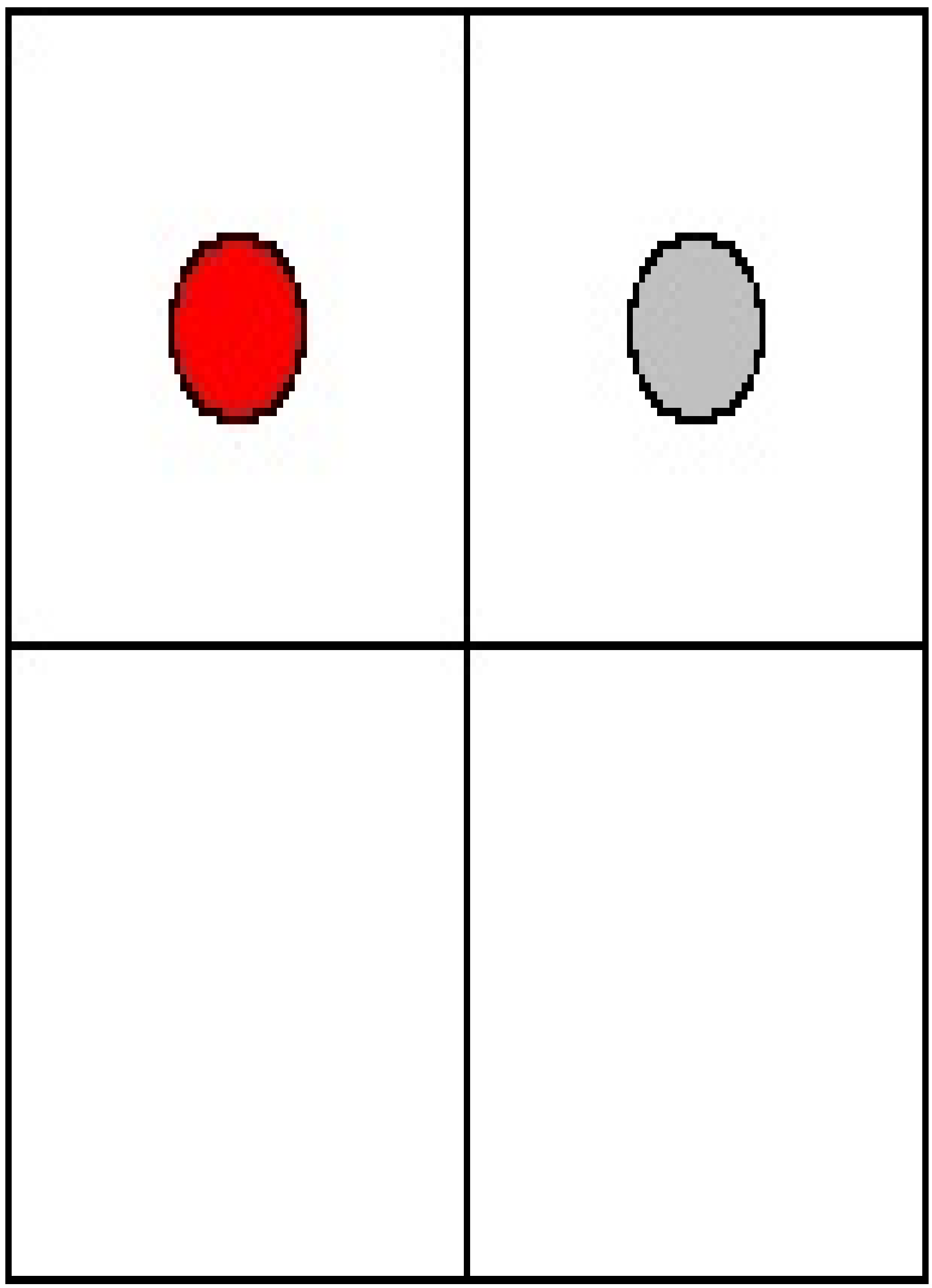




The Premisses, combined.



The Conclusion.



That story of yours, about your once meeting the sea-serpent, is totally devoid of interest.

PART I

ELEMENTARY

PREFACE TO THE FOURTH EDITION.

Table of Contents

The chief alterations, since the First Edition, have been made in the Chapter on ‘Classification’ (pp. 2, 3) and the Book on ‘Propositions’ (pp. 10 to 19). The chief additions have been the questions on words and phrases, added to the Examination-Papers at p. 94, and the Notes inserted at pp. 164, 194.

In Book I, Chapter II, I have adopted a new definition of ‘Classification’, which enables me to regard the whole Universe as a ‘Class,’ and thus to dispense with the very awkward phrase ‘a Set of Things.’

In the Chapter on ‘Propositions of Existence’ I have adopted a new ‘normal form,’ in which the Class, whose existence is affirmed or denied, is regarded as the Predicate, instead of the Subject, of the Proposition, thus evading a very subtle difficulty which besets the other form. These subtle difficulties seem to lie at the root of every Tree of Knowledge, and they are far more hopeless to grapple with than any that occur in its higher branches. For example, the difficulties of the Forty-Seventh Proposition of Euclid are mere child’s play compared with the mental torture endured in the effort to think out the essential nature of a straight Line. And, in the present work, the difficulties of the “5 Liars” Problem, at p. 192, are “trifles, light as air,” compared with the bewildering question “What is a Thing?”

In the Chapter on ‘Propositions of Relation’ I have inserted a new Section, containing the proof that a Proposition, beginning with “All,” is a Double Proposition (a fact that is quite independent of the arbitrary rule, laid down in the next Section, that such a Proposition is to be understood as implying the actual existence of its Subject). This proof was given, in the earlier editions, incidentally, in the course of the discussion of the Biliteral Diagram: but its proper place, in this treatise, is where I have now introduced it.

In the Sorites-Examples, I have made a good many verbal alterations, in order to evade a difficulty, which I fear will have perplexed some of the Readers of the

first three Editions. Some of the Premisses were so worded that their Terms were not Specieses of the Univ. named in the Dictionary, but of a larger Class, of which the Univ. was only a portion. In all such cases, it was intended that the Reader should perceive that what was asserted of the larger Class was thereby asserted of the Univ., and should ignore, as superfluous, all that it asserted of its other portion. Thus, in Ex. 15, the Univ. was stated to be “ducks in this village,” and the third Premiss was “Mrs. Bond has no gray ducks,” i.e. “No gray ducks are ducks belonging to Mrs. Bond.” Here the Terms are not Specieses of the Univ., but of the larger Class “ducks,” of which the Univ. is only a portion: and it was intended that the Reader should perceive that what is here asserted of “ ducks” is thereby asserted of “ ducks in this village.” and should treat this Premiss as if it were “Mrs. Bond has no gray ducks in this village,” and should ignore, as superfluous, what it asserts as to the other portion of the Class “ducks,” viz. “ Mrs. Bond has no gray ducks out of this village”.

In the Appendix I have given a new version of the Problem of the “Five Liars.” My object, in doing so, is to escape the subtle and mysterious difficulties which beset all attempts at regarding a Proposition as being its own Subject, or a Set of Propositions as being Subjects for one another. It is certainly, a most bewildering and unsatisfactory theory: one cannot help feeling that there is a great lack of substance in all this shadowy host——that, as the procession of phantoms glides before us, there is not one that we can pounce upon, and say “Here is a Proposition that must be either true or false!”——that it is but a Barmecide Feast, to which we have been bidden——and that its prototype is to be found in that mythical island, whose inhabitants “earned a precarious living by taking in each others’ washing”! By simply translating “telling 2 Truths” into “taking both of 2 condiments (salt and mustard),” “telling 2 Lies” into “taking neither of them” and “telling a Truth and a Lie (order not specified)” into “taking only one condiment (it is not specified which),” I have escaped all those metaphysical puzzles, and have produced a Problem which, when translated into a Set of symbolized Premisses, furnishes the very same Data as were furnished by the Problem of the “Five Liars.”

The coined words, introduced in previous editions, such as “Eliminands” and “Retinends”, perhaps hardly need any apology: they were indispensable to my system: but the new plural, here used for the first time, viz. “Soriteses”, will, I fear, be condemned as “bad English”, unless I say a word in its defence. We have three singular nouns, in English, of plural form, “series”, “species”, and “Sorites”: in all three, the awkwardness, of using the same word for both

singular and plural, must often have been felt: this has been remedied, in the case of “series” by coining the plural “serieses”, which has already found it way into the dictionaries: so I am no rash innovator, but am merely “following suit”, in using the new plural “Soriteses”.

In conclusion, let me point out that even those, who are obliged to study Formal Logic, with a view to being able to answer Examination-Papers in that subject, will find the study of Symbolic Logic most helpful for this purpose, in throwing light upon many of the obscurities with which Formal Logic abounds, and in furnishing a delightfully easy method of testing the results arrived at by the cumbrous processes which Formal Logic enforces upon its votaries.

This is, I believe, the very first attempt (with the exception of my own little book, The Game of Logic, published in 1886, a very incomplete performance) that has been made to popularise this fascinating subject. It has cost me years of hard work: but if it should prove, as I hope it may, to be of real service to the young, and to be taken up, in High Schools and in private families, as a valuable addition to their stock of healthful mental recreations, such a result would more than repay ten times the labour that I have expended on it.

L. C.

29, Bedford Street, Strand.

Christmas, 1896.

INTRODUCTION.

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TO LEARNERS.

[N.B. Some remarks, addressed to Teachers, will be found in the Appendix, at p. 165.]

The Learner, who wishes to try the question fairly, whether this little book does, or does not, supply the materials for a most interesting mental recreation, is earnestly advised to adopt the following Rules:—

(1) Begin at the beginning, and do not allow yourself to gratify a mere idle curiosity by dipping into the book, here and there. This would very likely lead to your throwing it aside, with the remark “This is much too hard for me!”, and thus losing the chance of adding a very large item to your stock of mental delights. This Rule (of not dipping) is very desirable with other kinds of books——such as novels, for instance, where you may easily spoil much of the enjoyment you would otherwise get from the story, by dipping into it further on, so that what the author meant to be a pleasant surprise comes to you as a matter of course. Some people, I know, make a practice of looking into Vol. III first, just to see how the story ends: and perhaps it is as well just to know that all ends happily——that the much-persecuted lovers do marry after all, that he is proved to be quite innocent of the murder, that the wicked cousin is completely foiled in his plot and gets the punishment he deserves, and that the rich uncle in India (Qu. Why in India? Ans. Because, somehow, uncles never can get rich anywhere else) dies at exactly the right moment——before taking the trouble to read Vol. I. This, I say, is just permissible with a novel, where Vol. III has a meaning, even for those who have not read the earlier part of the story; but, with a scientific

book, it is sheer insanity: you will find the latter part hopelessly unintelligible, if you read it before reaching it in regular course.

(2) Don't begin any fresh Chapter, or Section, until you are certain that you thoroughly understand the whole book up to that point, and that you have worked, correctly, most if not all of the examples which have been set. So long as you are conscious that all the land you have passed through is absolutely conquered, and that you are leaving no unsolved difficulties behind you, which will be sure to turn up again later on, your triumphal progress will be easy and delightful. Otherwise, you will find your state of puzzlement get worse and worse as you proceed, till you give up the whole thing in utter disgust.

(3) When you come to any passage you don't understand, read it again: if you still don't understand it, read it again: if you fail, even after three readings, very likely your brain is getting a little tired. In that case, put the book away, and take to other occupations, and next day, when you come to it fresh, you will very likely find that it is quite easy.

(4) If possible, find some genial friend, who will read the book along with you, and will talk over the difficulties with you. Talking is a wonderful smoother-over of difficulties. When I come upon anything——in Logic or in any other hard subject——that entirely puzzles me, I find it a capital plan to talk it over, aloud, even when I am all alone. One can explain things so clearly to one's self! And then, you know, one is so patient with one's self: one never gets irritated at one's own stupidity!

If, dear Reader, you will faithfully observe these Rules, and so give my little book a really fair trial, I promise you, most confidently, that you will find Symbolic Logic to be one of the most, if not the most, fascinating of mental recreations! In this First Part, I have carefully avoided all difficulties which seemed to me to be beyond the grasp of an intelligent child of (say) twelve or fourteen years of age. I have myself taught most of its contents, vivâ voce, to many children, and have found them take a real intelligent interest in the subject. For those, who succeed in mastering Part I, and who begin, like Oliver, "asking for more," I hope to provide, in Part II, some tolerably hard nuts to crack——nuts that will require all the nut-crackers they happen to possess!

Mental recreation is a thing that we all of us need for our mental health; and you may get much healthy enjoyment, no doubt, from Games, such as Back-

gammon, Chess, and the new Game “Halma”. But, after all, when you have made yourself a first-rate player at any one of these Games, you have nothing real to show for it, as a result! You enjoyed the Game, and the victory, no doubt, at the time: but you have no result that you can treasure up and get real good out of. And, all the while, you have been leaving unexplored a perfect mine of wealth. Once master the machinery of Symbolic Logic, and you have a mental occupation always at hand, of absorbing interest, and one that will be of real use to you in any subject you may take up. It will give you clearness of thought——the ability to see your way through a puzzle——the habit of arranging your ideas in an orderly and get-at-able form——and, more valuable than all, the power to detect fallacies, and to tear to pieces the flimsy illogical arguments, which you will so continually encounter in books, in newspapers, in speeches, and even in sermons, and which so easily delude those who have never taken the trouble to master this fascinating Art. Try it. That is all I ask of you!

L. C.

29, Bedford Street, Strand.

February 21, 1896.

BOOK I.

THINGS AND THEIR ATTRIBUTES.

CHAPTER I.

INTRODUCTORY.

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The Universe contains ‘Things.’

[For example, “I,” “London,” “roses,” “redness,” “old English books,” “the letter which I received yesterday.”]

Things have ‘Attributes.’

[For example, “large,” “red,” “old,” “which I received yesterday.”]

One Thing may have many Attributes; and one Attribute may belong to many Things.

[Thus, the Thing “a rose” may have the Attributes “red,” “scented,” “full-blown,” &c.; and the Attribute “red” may belong to the Things “a rose,” “a brick,” “a ribbon,” &c.]

Any Attribute, or any Set of Attributes, may be called an ‘Adjunct.’

[This word is introduced in order to avoid the constant repetition of the phrase “Attribute or Set of Attributes.”

Thus, we may say that a rose has the Attribute “red” (or the Adjunct “red,” whichever we prefer); or we may say that it has the Adjunct “red, scented and full-blown.”]

CHAPTER II.

CLASSIFICATION.

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‘Classification,’ or the formation of Classes, is a Mental Process, in which we imagine that we have put together, in a group, certain Things. Such a group is called a ‘Class.’

This Process may be performed in three different ways, as follows:—

(1) We may imagine that we have put together all Things. The Class so formed (i.e. the Class “Things”) contains the whole Universe.

(2) We may think of the Class “Things,” and may imagine that we have picked out from it all the Things which possess a certain Adjunct not possessed by the whole Class. This Adjunct is said to be ‘peculiar’ to the Class so formed. In this case, the Class “Things” is called a ‘Genus’ with regard to the Class so formed: the Class, so formed, is called a ‘Species’ of the Class “Things”: and its peculiar Adjunct is called its ‘Differentia’.

As this Process is entirely Mental, we can perform it whether there is, or is not, an existing Thing which possesses that Adjunct. If there is, the Class is said to be ‘Real’; if not, it is said to be ‘Unreal’, or ‘Imaginary.’

[For example, we may imagine that we have picked out, from the Class “Things,” all the Things which possess the Adjunct “material, artificial, consisting of houses and streets”; and we may thus form the Real Class “towns.” Here we may regard “Things” as a Genus, “Towns” as a Species of Things, and “material, artificial, consisting of houses and streets” as its Differentia.

Again, we may imagine that we have picked out all the Things which possess the Adjunct “weighing a ton, easily lifted by a baby”; and we may thus form the Imaginary Class “Things that weigh a ton and are easily lifted by a baby.”]

(3) We may think of a certain Class, not the Class “Things,” and may imagine that we have picked out from it all the Members of it which possess a certain Adjunct not possessed by the whole Class. This Adjunct is said to be ‘peculiar’ to the smaller Class so formed. In this case, the Class thought of is called a ‘Genus’ with regard to the smaller Class picked out from it: the smaller Class is called a ‘Species’ of the larger: and its peculiar Adjunct is called its ‘Differentia’.

[For example, we may think of the Class “towns,” and imagine that we have picked out from it all the towns which possess the Attribute “lit with gas”; and we may thus form the Real Class “towns lit with gas.” Here we may regard “Towns” as a Genus, “Towns lit with gas” as a Species of Towns, and “lit with gas” as its Differentia.

If, in the above example, we were to alter “lit with gas” into “paved with gold,” we should get the Imaginary Class “towns paved with gold.”]

A Class, containing only one Member is called an ‘Individual.’

[For example, the Class “towns having four million inhabitants,” which Class contains only one Member, viz. “London.”]

Hence, any single Thing, which we can name so as to distinguish it from all other Things, may be regarded as a one-Member Class.

[Thus “London” may be regarded as the one-Member Class, picked out from the Class “towns,” which has, as its Differentia, “having four million inhabitants.”]

A Class, containing two or more Members, is sometimes regarded as one single Thing. When so regarded, it may possess an Adjunct which is not possessed by any Member of it taken separately.

[Thus, the Class “The soldiers of the Tenth Regiment,” when regarded as one single Thing, may possess the Attribute “formed in square,” which is not possessed by any Member of it taken separately.]

CHAPTER III.

DIVISION.

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§ 1.

Introductory.

‘Division’ is a Mental Process, in which we think of a certain Class of Things, and imagine that we have divided it into two or more smaller Classes.

[Thus, we might think of the Class “books,” and imagine that we had divided it into the two smaller Classes “bound books” and “unbound books,” or into the three Classes, “books priced at less than a shilling,” “shilling-books,” “books priced at more than a shilling,” or into the twenty-six Classes, “books whose names begin with A,” “books whose names begin with B,” &c.]

A Class, that has been obtained by a certain Division, is said to be ‘codivisional’ with every Class obtained by that Division.

[Thus, the Class “bound books” is codivisional with each of the two Classes, “bound books” and “unbound books.”

Similarly, the Battle of Waterloo may be said to have been “contemporary” with every event that happened in 1815.]

Hence a Class, obtained by Division, is codivisional with itself.

[Thus, the Class “bound books” is codivisional with itself.

Similarly, the Battle of Waterloo may be said to have been “contemporary” with itself.]

§ 2.

Dichotomy.

If we think of a certain Class, and imagine that we have picked out from it a certain smaller Class, it is evident that the Remainder of the large Class does not possess the Differentia of that smaller Class. Hence it may be regarded as another smaller Class, whose Differentia may be formed, from that of the Class first picked out, by prefixing the word “not”; and we may imagine that we have divided the Class first thought of into two smaller Classes, whose Differentiæ are contradictory. This kind of Division is called ‘Dichotomy’.

[For example, we may divide “books” into the two Classes whose Differentiæ are “old” and “not-old.”]

In performing this Process, we may sometimes find that the Attributes we have chosen are used so loosely, in ordinary conversation, that it is not easy to decide which of the Things belong to the one Class and which to the other. In such a case, it would be necessary to lay down some arbitrary rule, as to where the one Class should end and the other begin.

[Thus, in dividing "books" into "old" and "not-old," we may say "Let all books printed before a.d. 1801, be regarded as 'old,' and all others as 'not-old'."]

Hence forwards let it be understood that, if a Class of Things be divided into two Classes, whose Differentiæ have contrary meanings, each Differentia is to be regarded as equivalent to the other with the word "not" prefixed.

[Thus, if "books" be divided into "old" and "new" the Attribute "old" is to be regarded as equivalent to "not-new," and the Attribute "new" as equivalent to "not-old."]

After dividing a Class, by the Process of Dichotomy, into two smaller Classes, we may subdivide each of these into two still smaller Classes; and this Process may be repeated over and over again, the number of Classes being doubled at each repetition.

[For example, we may divide "books" into "old" and "new" (i.e. "not-old"): we may then subdivide each of these into "English" and "foreign" (i.e. "not-English"), thus getting four Classes, viz.

(1) old English;

(2) old foreign;

(3) new English;

(4) new foreign.

If we had begun by dividing into “English” and “foreign,” and had then subdivided into “old” and “new,” the four Classes would have been

(1) English old;

(2) English new;

(3) foreign old;

(4) foreign new.

The Reader will easily see that these are the very same four Classes which we had before.]

CHAPTER IV.

NAMES.

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The word “Thing”, which conveys the idea of a Thing, without any idea of an Adjunct, represents any single Thing. Any other word (or phrase), which conveys the idea of a Thing, with the idea of an Adjunct represents any Thing which possesses that Adjunct; i.e., it represents any Member of the Class to which that Adjunct is peculiar.

Such a word (or phrase) is called a ‘Name’; and, if there be an existing Thing which it represents, it is said to be a Name of that Thing.

[For example, the words “Thing,” “Treasure,” “Town,” and the phrases “valuable Thing,” “material artificial Thing consisting of houses and streets,” “Town lit with gas,” “Town paved with gold,” “old English Book.”]

Just as a Class is said to be Real, or Unreal, according as there is, or is not, an existing Thing in it, so also a Name is said to be Real, or Unreal, according as there is, or is not, an existing Thing represented by it.

[Thus, “Town lit with gas” is a Real Name: “Town paved with gold” is an Unreal Name.]

Every Name is either a Substantive only, or else a phrase consisting of a Substantive and one or more Adjectives (or phrases used as Adjectives).

Every Name, except “Thing”, may usually be expressed in three different forms: —

(a) The Substantive “Thing”, and one or more Adjectives (or phrases used as Adjectives) conveying the ideas of the Attributes;

(b) A Substantive, conveying the idea of a Thing with the ideas of some of the Attributes, and one or more Adjectives (or phrases used as Adjectives) conveying the ideas of the other Attributes;

(c) A Substantive conveying the idea of a Thing with the ideas of all the Attributes.

[Thus, the phrase “material living Thing, belonging to the Animal Kingdom, having two hands and two feet” is a Name expressed in Form (a).

If we choose to roll up together the Substantive “Thing” and the Adjectives “material, living, belonging to the Animal Kingdom,” so as to make the new Substantive “Animal,” we get the phrase “Animal having two hands and two feet,” which is a Name (representing the same Thing as before) expressed in Form (b).

And, if we choose to roll up the whole phrase into one word, so as to make the new Substantive “Man,” we get a Name (still representing the very same Thing) expressed in Form (c).]

A Name, whose Substantive is in the plural number, may be used to represent

either

(1) Members of a Class, regarded as separate Things;

or (2) a whole Class, regarded as one single Thing.

[Thus, when I say “Some soldiers of the Tenth Regiment are tall,” or “The soldiers of the Tenth Regiment are brave,” I am using the Name “soldiers of the Tenth Regiment” in the first sense; and it is just the same as if I were to point to each of them separately, and to say “This soldier of the Tenth Regiment is tall,” “That soldier of the Tenth Regiment is tall,” and so on.

But, when I say “The soldiers of the Tenth Regiment are formed in square,” I am using the phrase in the second sense; and it is just the same as if I were to say “The Tenth Regiment is formed in square.”]

CHAPTER V.

DEFINITIONS.

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It is evident that every Member of a Species is also a Member of the Genus out of which that Species has been picked, and that it possesses the Differentia of that Species. Hence it may be represented by a Name consisting of two parts, one being a Name representing any Member of the Genus, and the other being the Differentia of that Species. Such a Name is called a ‘Definition’ of any Member of that Species, and to give it such a Name is to ‘define’ it.

[Thus, we may define a “Treasure” as a “valuable Thing.” In this case we regard “Things” as the Genus, and “valuable” as the Differentia.]

The following Examples, of this Process, may be taken as models for working others.

[Note that, in each Definition, the Substantive, representing a Member (or Members) of the Genus, is printed in Capitals.]

1. Define “a Treasure.”

Ans. "a valuable Thing."

2. Define "Treasures."

Ans. "valuable Things."

3. Define "a Town."

Ans. "a material artificial Thing, consisting of houses and streets."

4. Define "Men."

Ans. "material, living Things, belonging to the Animal Kingdom, having two hands and two feet";

or else

"Animals having two hands and two feet."

5. Define "London."

Ans. "the material artificial Thing, which consists of houses and streets, and has four million inhabitants";

or else

"the Town which has four million inhabitants."

[Note that we here use the article "the" instead of "a", because we happen to know that there is only one such Thing.

The Reader can set himself any number of Examples of this Process, by simply choosing the Name of any common Thing (such as "house," "tree," "knife"), making a Definition for it, and then testing his answer by referring to any English Dictionary.]

BOOK II.

PROPOSITIONS.

CHAPTER I.

PROPOSITIONS GENERALLY.

Table of Contents

§ 1.

Introductory.

Note that the word “some” is to be regarded, henceforward, as meaning “one or more.”

The word ‘Proposition,’ as used in ordinary conversation, may be applied to any word, or phrase, which conveys any information whatever.

[Thus the words “yes” and “no” are Propositions in the ordinary sense of the word; and so are the phrases “you owe me five farthings” and “I don’t!”

Such words as “oh!” or “never!”, and such phrases as “fetch me that book!” “which book do you mean?” do not seem, at first sight, to convey any information; but they can easily be turned into equivalent forms which do so, viz. “I am surprised,” “I will never consent to it,” “I order you to fetch me that book,” “I want to know which book you mean.”]

But a ‘Proposition,’ as used in this First Part of “Symbolic Logic,” has a peculiar form, which may be called its ‘Normal form’; and if any Proposition, which we wish to use in an argument, is not in normal form, we must reduce it to such a form, before we can use it.

A ‘Proposition,’ when in normal form, asserts, as to certain two Classes, which are called its ‘Subject’ and ‘Predicate,’ either

(1) that some Members of its Subject are Members of its Predicate;

or (2) that no Members of its Subject are Members of its Predicate;

or (3) that all Members of its Subject are Members of its Predicate.

The Subject and the Predicate of a Proposition are called its ‘Terms.’

Two Propositions, which convey the same information, are said to be ‘equivalent’.

[Thus, the two Propositions, “I see John” and “John is seen by me,” are equivalent.]

§ 2.

Normal form of a Proposition.

A Proposition, in normal form, consists of four parts, viz.—

(1) The word “some,” or “no,” or “all.” (This word, which tells us how many Members of the Subject are also Members of the Predicate, is called the ‘Sign of Quantity.’)

(2) Name of Subject.

(3) The verb “are” (or “is”). (This is called the ‘Copula.’)

(4) Name of Predicate.

§ 3.

Various kinds of Propositions.

A Proposition, that begins with “Some”, is said to be ‘Particular.’ It is also called ‘a Proposition in I.’

[Note, that it is called ‘Particular,’ because it refers to a part only of the Subject.]

A Proposition, that begins with “No”, is said to be ‘Universal Negative.’ It is also called ‘a Proposition in E.’

A Proposition, that begins with “All”, is said to be ‘Universal Affirmative.’ It is also called ‘a Proposition in A.’

[Note, that they are called ‘Universal’, because they refer to the whole of the Subject.]

A Proposition, whose Subject is an Individual, is to be regarded as Universal.

[Let us take, as an example, the Proposition “John is not well”. This of course implies that there is an Individual, to whom the speaker refers when he mentions “John”, and whom the listener knows to be referred to. Hence the Class “men referred to by the speaker when he mentions ‘John’” is a one-Member Class, and the Proposition is equivalent to “All the men, who are referred to by the speaker when he mentions ‘John’, are not well.”]

Propositions are of two kinds, ‘Propositions of Existence’ and ‘Propositions of Relation.’

These shall be discussed separately.

CHAPTER II.

PROPOSITIONS OF EXISTENCE.

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A ‘Proposition of Existence’, when in normal form, has, for its Subject, the Class “existing Things”.

Its Sign of Quantity is “Some” or “No”.

[Note that, though its Sign of Quantity tells us how many existing Things are Members of its Predicate, it does not tell us the exact number: in fact, it only deals with two numbers, which are, in ascending order, “0” and “1 or more.”]

It is called “a Proposition of Existence” because its effect is to assert the Reality (i.e. the real existence), or else the Imaginariness, of its Predicate.

[Thus, the Proposition “Some existing Things are honest men” asserts that the Class “honest men” is Real.

This is the normal form; but it may also be expressed in any one of the following forms:—

(1) “Honest men exist”;

(2) “Some honest men exist”;

(3) “The Class ‘honest men’ exists”;

(4) “There are honest men”;

(5) “There are some honest men”.

Similarly, the Proposition “No existing Things are men fifty feet high” asserts that the Class “men 50 feet high” is Imaginary.

This is the normal form; but it may also be expressed in any one of the following forms:—

(1) “Men 50 feet high do not exist”;

(2) “No men 50 feet high exist”;

(3) “The Class ‘men 50 feet high’ does not exist”;

(4) “There are not any men 50 feet high”;

(5) “There are no men 50 feet high.”]

CHAPTER III.

PROPOSITIONS OF RELATION.

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§ 1.

Introductory.

A Proposition of Relation, of the kind to be here discussed, has, for its Terms, two Specieses of the same Genus, such that each of the two Names conveys the idea of some Attribute not conveyed by the other.

[Thus, the Proposition “Some merchants are misers” is of the right kind, since “merchants” and “misers” are Specieses of the same Genus “men”; and since the Name “merchants” conveys the idea of the Attribute “mercantile”, and the name “misers” the idea of the Attribute “miserly”, each of which ideas is not conveyed by the other Name.

But the Proposition “Some dogs are setters” is not of the right kind, since, although it is true that “dogs” and “setters” are Specieses of the same Genus “animals”, it is not true that the Name “dogs” conveys the idea of any Attribute not conveyed by the Name “setters”. Such Propositions will be discussed in Part II.]

The Genus, of which the two Terms are Specieses, is called the ‘Universe of Discourse,’ or (more briefly) the ‘Univ.’

The Sign of Quantity is “Some” or “No” or “All”.

[Note that, though its Sign of Quantity tells us how many Members of its Subject are also Members of its Predicate, it does not tell us the exact number: in fact, it only deals with three numbers, which are, in ascending order, “0”, “1 or more”, “the total number of Members of the Subject”.]

It is called “a Proposition of Relation” because its effect is to assert that a certain relationship exists between its Terms.

§ 2.

Reduction of a Proposition of Relation to Normal form.

The Rules, for doing this, are as follows:—

(1) Ascertain what is the Subject (i.e., ascertain what Class we are talking about);

(2) If the verb, governed by the Subject, is not the verb “are” (or “is”), substitute for it a phrase beginning with “are” (or “is”);

(3) Ascertain what is the Predicate (i.e., ascertain what Class it is, which is asserted to contain some, or none, or all, of the Members of the Subject);

(4) If the Name of each Term is completely expressed (i.e. if it contains a

Substantive), there is no need to determine the ‘Univ.’; but, if either Name is incompletely expressed, and contains Attributes only, it is then necessary to determine a ‘Univ.’, in order to insert its Name as the Substantive.

(5) Ascertain the Sign of Quantity;

(6) Arrange in the following order:—

Sign of Quantity,

Subject,

Copula,

Predicate.

[Let us work a few Examples, to illustrate these Rules.

(1)

“Some apples are not ripe.”

(1) The Subject is “apples.”

(2) The Verb is “are.”

(3) The Predicate is “not-ripe *.” (As no Substantive is expressed, and we have not yet settled what the Univ. is to be, we are forced to leave a blank.)

(4) Let Univ. be “fruit.”

(5) The Sign of Quantity is “some.”

(6) The Proposition now becomes

“Some | apples | are | not-ripe fruit.”

(2)

“None of my speculations have brought me as much as 5 per cent.”

(1) The Subject is “my speculations.”

(2) The Verb is “have brought,” for which we substitute the phrase “are * that have brought”.

(3) The Predicate is “ * that have brought &c.”

(4) Let Univ. be “transactions.”

(5) The Sign of Quantity is “none of.”

(6) The Proposition now becomes

“None of | my speculations | are | transactions that have brought me as much as 5 per cent.”

(3)

“None but the brave deserve the fair.”

To begin with, we note that the phrase “none but the brave” is equivalent to “no

not-brave.”

(1) The Subject has for its Attribute “not-brave.” But no Substantive is supplied. So we express the Subject as “not-brave *.”

(2) The Verb is “deserve,” for which we substitute the phrase “are deserving of”.

(3) The Predicate is “ * deserving of the fair.”

(4) Let Univ. be “persons.”

(5) The Sign of Quantity is “no.”

(6) The Proposition now becomes

“No | not-brave persons | are | persons deserving of the fair.”

(4)

“A lame puppy would not say “thank you” if you offered to lend it a skipping-rope.”

(1) The Subject is evidently “lame puppies,” and all the rest of the sentence must somehow be packed into the Predicate.

(2) The Verb is “would not say,” &c., for which we may substitute the phrase “are not grateful for.”

(3) The Predicate may be expressed as “ * not grateful for the loan of a skipping-rope.”

(4) Let Univ. be “puppies.”

(5) The Sign of Quantity is “all.”

(6) The Proposition now becomes

"All | lame puppies | are | puppies not grateful for the loan of a skipping-rope."

(5)

"No one takes in the Times, unless he is well-educated."

(1) The Subject is evidently persons who are not well-educated ("no one" evidently means "no person").

(2) The Verb is "takes in," for which we may substitute the phrase "are persons taking in."

(3) The Predicate is "persons taking in the Times."

(4) Let Univ. be "persons."

(5) The Sign of Quantity is "no."

(6) The Proposition now becomes

"No | persons who are not well-educated | are | persons taking in the Times."

(6)

"My carriage will meet you at the station."

(1) The Subject is "my carriage." This, being an 'Individual,' is equivalent to the

Class “my carriages.” (Note that this Class contains only one Member.)

(2) The Verb is “will meet”, for which we may substitute the phrase “are * that will meet.”

(3) The Predicate is “ * that will meet you at the station.”

(4) Let Univ. be “things.”

(5) The Sign of Quantity is “all.”

(6) The Proposition now becomes

“All | my carriages | are | things that will meet you at the station.”

(7)

“Happy is the man who does not know what ‘toothache’ means!”

(1) The Subject is evidently “the man &c.” (Note that in this sentence, the Predicate comes first.) At first sight, the Subject seems to be an ‘Individual’; but on further consideration, we see that the article “the” does not imply that there is only one such man. Hence the phrase “the man who” is equivalent to “all men who”.

(2) The Verb is “are.”

(3) The Predicate is “happy *.”

(4) Let Univ. be “men.”

(5) The Sign of Quantity is “all.”

(6) The Proposition now becomes

“All | men who do not know what ‘toothache’ means | are | happy men.”

(8)

“Some farmers always grumble at the weather, whatever it may be.”

(1) The Subject is “farmers.”

(2) The Verb is “grumble,” for which we substitute the phrase “are * who grumble.”

(3) The Predicate is “ * who always grumble &c.”

(4) Let Univ. be “persons.”

(5) The Sign of Quantity is “some.”

(6) The Proposition now becomes

“Some | farmers | are | persons who always grumble at the weather, whatever it may be.”

(9)

“No lambs are accustomed to smoke cigars.”

(1) The Subject is “lambs.”

(2) The Verb is “are.”

(3) The Predicate is “ * accustomed &c.”

(4) Let Univ. be “animals.”

(5) The Sign of Quantity is “no.”

(6) The Proposition now becomes

“No | lambs | are | animals accustomed to smoke cigars.”

(10)

“I ca’n’t understand examples that are not arranged in regular order, like those I am used to.”

(1) The Subject is “examples that,” &c.

(2) The Verb is “I ca’n’t understand,” which we must alter, so as to have “examples,” instead of “I,” as the nominative case. It may be expressed as “are not understood by me.”

(3) The Predicate is “ * not understood by me.”

(4) Let Univ. be “examples.”

(5) The Sign of Quantity is “all.”

(6) The Proposition now becomes

“All | examples that are not arranged in regular order like those I am used to | are | examples not understood by me.”]

§ 3.

A Proposition of Relation, beginning with "All", is a Double Proposition.

A Proposition of Relation, beginning with "All", asserts (as we already know) that "All Members of the Subject are Members of the Predicate". This evidently contains, as a part of what it tells us, the smaller Proposition "Some Members of the Subject are Members of the Predicate".

[Thus, the Proposition "All bankers are rich men" evidently contains the smaller Proposition "Some bankers are rich men".]

The question now arises "What is the rest of the information which this Proposition gives us?"

In order to answer this question, let us begin with the smaller Proposition, "Some Members of the Subject are Members of the Predicate," and suppose that this is all we have been told; and let us proceed to inquire what else we need to be told, in order to know that "All Members of the Subject are Members of the Predicate".

[Thus, we may suppose that the Proposition "Some bankers are rich men" is all the information we possess; and we may proceed to inquire what other Proposition needs to be added to it, in order to make up the entire Proposition "All bankers are rich men".]

Let us also suppose that the 'Univ.' (i.e. the Genus, of which both the Subject and the Predicate are Specieses) has been divided (by the Process of Dichotomy)

into two smaller Classes, viz.

(1) the Predicate;

(2) the Class whose Differentia is contradictory to that of the Predicate.

[Thus, we may suppose that the Genus “men,” (of which both “bankers” and “rich men” are Specieses) has been divided into the two smaller Classes, “rich men”, “poor men”.]

Now we know that every Member of the Subject is (as shown at p. 6) a Member of the Univ. Hence every Member of the Subject is either in Class (1) or else in Class (2).

[Thus, we know that every banker is a Member of the Genus “men”. Hence, every banker is either in the Class “rich men”, or else in the Class “poor men”.]

Also we have been told that, in the case we are discussing, some Members of the Subject are in Class (1). What else do we need to be told, in order to know that all of them are there? Evidently we need to be told that none of them are in Class (2); i.e. that none of them are Members of the Class whose Differentia is contradictory to that of the Predicate.

[Thus, we may suppose we have been told that some bankers are in the Class “rich men”. What else do we need to be told, in order to know that all of them are there? Evidently we need to be told that none of them are in the Class “poor

men”.]

Hence a Proposition of Relation, beginning with “All”, is a Double Proposition, and is ‘equivalent’ to (i.e. gives the same information as) the two Propositions

(1) “Some Members of the Subject are Members of the Predicate”;

(2) “No Members of the Subject are Members of the Class whose Differentia is contradictory to that of the Predicate”.

[Thus, the Proposition “All bankers are rich men” is a Double Proposition, and is equivalent to the two Propositions

(1) “Some bankers are rich men”;

(2) “No bankers are poor men”.]

§ 4.

What is implied, in a Proposition of Relation, as to the Reality of its Terms?

Note that the rules, here laid down, are arbitrary, and only apply to Part I of my “Symbolic Logic.”

A Proposition of Relation, beginning with “Some”, is henceforward to be understood as asserting that there are some existing Things, which, being Members of the Subject, are also Members of the Predicate; i.e. that some existing Things are Members of both Terms at once. Hence it is to be understood as implying that each Term, taken by itself, is Real.

[Thus, the Proposition “Some rich men are invalids” is to be understood as asserting that some existing Things are “rich invalids”. Hence it implies that each of the two Classes, “rich men” and “invalids”, taken by itself, is Real.]

A Proposition of Relation, beginning with “No”, is henceforward to be understood as asserting that there are no existing Things which, being Members of the Subject, are also Members of the Predicate; i.e. that no existing Things are Members of both Terms at once. But this implies nothing as to the Reality of either Term taken by itself.

[Thus, the Proposition “No mermaids are milliners” is to be understood as asserting that no existing Things are “mermaid-milliners”. But this implies nothing as to the Reality, or the Unreality, of either of the two Classes, “mermaids” and “milliners”, taken by itself. In this case as it happens, the Subject is Imaginary, and the Predicate Real.]

A Proposition of Relation, beginning with “All”, contains (see § 3) a similar Proposition beginning with “Some”. Hence it is to be understood as implying that each Term, taken by itself, is Real.

[Thus, the Proposition “All hyænas are savage animals” contains the Proposition “Some hyænas are savage animals”. Hence it implies that each of the two Classes, “hyænas” and “savage animals”, taken by itself, is Real.]

§ 5.

Translation of a Proposition of Relation into one or more Propositions of Existence.

We have seen that a Proposition of Relation, beginning with "Some," asserts that some existing Things, being Members of its Subject, are also Members of its Predicate. Hence, it asserts that some existing Things are Members of both; i.e. it asserts that some existing Things are Members of the Class of Things which have all the Attributes of the Subject and the Predicate.

Hence, to translate it into a Proposition of Existence, we take "existing Things" as the new Subject, and Things, which have all the Attributes of the Subject and the Predicate, as the new Predicate.

Similarly for a Proposition of Relation beginning with "No".

A Proposition of Relation, beginning with "All", is (as shown in § 3) equivalent to two Propositions, one beginning with "Some" and the other with "No", each of which we now know how to translate.

[Let us work a few Examples, to illustrate these Rules.

(1)

"Some apples are not ripe."

Here we arrange thus:—

“Some” Sign of Quantity.

“existing Things” Subject.

“are” Copula.

“not-ripe apples” Predicate.

or thus:—

“Some | existing Things | are | not-ripe apples.”

(2)

“Some farmers always grumble at the weather, whatever it may be.”

Here we arrange thus:—

“Some | existing Things | are | farmers who always grumble at the weather, whatever it may be.”

(3)

“No lambs are accustomed to smoke cigars.”

Here we arrange thus:—

“No | existing Things |are | lambs accustomed to smoke cigars.”

(4)

“None of my speculations have brought me as much as 5 per cent.”

Here we arrange thus:—

“No | existing Things | are | speculations of mine, which have brought me as much as 5 per cent.”

(5)

“None but the brave deserve the fair.”

Here we note, to begin with, that the phrase “none but the brave” is equivalent to “no not-brave men.” We then arrange thus:—

“No | existing Things | are | not-brave men deserving of the fair.”

(6)

“All bankers are rich men.”

This is equivalent to the two Propositions “Some bankers are rich men” and “No bankers are poor men.”

Here we arrange thus:—

“Some | existing Things | are | rich bankers”; and “No | existing Things | are | poor bankers.”]

[Work Examples § 1, 1–4 (p. 97).]

BOOK III.

THE BILITERAL DIAGRAM.

xy	xy'
$x'y$	$x'y'$

CHAPTER I.

SYMBOLS AND CELLS.

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First, let us suppose that the above Diagram is an enclosure assigned to a certain Class of Things, which we have selected as our ‘Universe of Discourse.’ or, more briefly, as our ‘Univ’.

[For example, we might say “Let Univ. be ‘books’”; and we might imagine the Diagram to be a large table, assigned to all “books.”]

[The Reader is strongly advised, in reading this Chapter, not to refer to the above Diagram, but to draw a large one for himself, without any letters, and to have it by him while he reads, and keep his finger on that particular part of it, about which he is reading.]

Secondly, let us suppose that we have selected a certain Adjunct, which we may call “x,” and have divided the large Class, to which we have assigned the whole Diagram, into the two smaller Classes whose Differentiæ are “x” and “not-x” (which we may call “x′”), and that we have assigned the North Half of the Diagram to the one (which we may call “the Class of x-Things,” or “the x-Class”), and the South Half to the other (which we may call “the Class of x′-Things,” or “the x′-Class”).

[For example, we might say “Let x mean ‘old,’ so that x′ will mean ‘new’,” and we might suppose that we had divided books into the two Classes whose Differentiæ are “old” and “new,” and had assigned the North Half of the table to “old books” and the South Half to “new books.”]

Thirdly, let us suppose that we have selected another Adjunct, which we may call “y”, and have subdivided the x-Class into the two Classes whose Differentiæ are “y” and “y′”, and that we have assigned the North-West Cell to the one (which we may call “the xy-Class”), and the North-East Cell to the other (which we may call “the xy′-Class”).

[For example, we might say “Let y mean ‘English,’ so that y′ will mean ‘foreign’”, and we might suppose that we had subdivided “old books” into the two Classes whose Differentiæ are “English” and “foreign”, and had assigned the North-West Cell to “old English books”, and the North-East Cell to “old foreign books.”]

Fourthly, let us suppose that we have subdivided the x′-Class in the same manner, and have assigned the South-West Cell to the x′y-Class, and the South-East Cell to the x′y′-Class.

[For example, we might suppose that we had subdivided “new books” into the two Classes “new English books” and “new foreign books”, and had assigned the South-West Cell to the one, and the South-East Cell to the other.]

It is evident that, if we had begun by dividing for y and y′, and had then subdivided for x and x′, we should have got the same four Classes. Hence we see that we have assigned the West Half to the y-Class, and the East Half to the y′-Class.

old English books	old foreign books
new English books	new foreign books

[Thus, in the above Example, we should find that we had assigned the West Half of the table to “English books” and the East Half to “foreign books.”

We have, in fact, assigned the four Quarters of the table to four different Classes of books, as here shown.]

The Reader should carefully remember that, in such a phrase as “the x-Things,” the word “Things” means that particular kind of Things, to which the whole Diagram has been assigned.

[Thus, if we say “Let Univ. be ‘books’,” we mean that we have assigned the whole Diagram to “books.” In that case, if we took “x” to mean “old”, the phrase “the x-Things” would mean “the old books.”]

The Reader should not go on to the next Chapter until he is quite familiar with the blank Diagram I have advised him to draw.

He ought to be able to name, instantly, the Adjunct assigned to any Compartment named in the right-hand column of the following Table.

Also he ought to be able to name, instantly, the Compartment assigned to any Adjunct named in the left-hand column.

To make sure of this, he had better put the book into the hands of some genial friend, while he himself has nothing but the blank Diagram, and get that genial friend to question him on this Table, dodging about as much as possible. The Questions and Answers should be something like this:—

TABLE I.

Adjuncts of Classes.
x
x′
y
y′
xy
xy′
x′y
x′y′

Q. “Adjunct for West Half?” A. “y.” Q. “Compartment for xy′?” A. “North-Eas

After a little practice, he will find himself able to do without the blank Diagram, and will be able to see it mentally ("in my mind's eye, Horatio!") while answering the questions of his genial friend. When this result has been reached, he may safely go on to the next Chapter.

CHAPTER II.

COUNTERS.

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Let us agree that a Red Counter, placed within a Cell, shall mean “This Cell is occupied” (i.e. “There is at least one Thing in it”).

Let us also agree that a Red Counter, placed on the partition between two Cells, shall mean “The Compartment, made up of these two Cells, is occupied; but it is not known whereabouts, in it, its occupants are.” Hence it may be understood to mean “At least one of these two Cells is occupied: possibly both are.”

Our ingenious American cousins have invented a phrase to describe the condition of a man who has not yet made up his mind which of two political parties he will join: such a man is said to be “sitting on the fence.” This phrase exactly describes the condition of the Red Counter.

Let us also agree that a Grey Counter, placed within a Cell, shall mean “This Cell is empty” (i.e. “There is nothing in it”).

[The Reader had better provide himself with 4 Red Counters and 5 Grey ones.]

CHAPTER III.

REPRESENTATION OF PROPOSITIONS.

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§ 1.

Introductory.

Henceforwards, in stating such Propositions as “Some x-Things exist” or “No x-Things are y-Things”, I shall omit the word “Things”, which the Reader can supply for himself, and shall write them as “Some x exist” or “No x are y”.

[Note that the word “Things” is here used with a special meaning, as explained at p. 23.]

A Proposition, containing only one of the Letters used as Symbols for Attributes, is said to be ‘Uniliteral’.

[For example, “Some x exist”, “No y′ exist”, &c.]

A Proposition, containing two Letters, is said to be ‘Biliteral’.

[For example, “Some xy′ exist”, “No x′ are y”, &c.]

A Proposition is said to be ‘in terms of’ the Letters it contains, whether with or without accents.

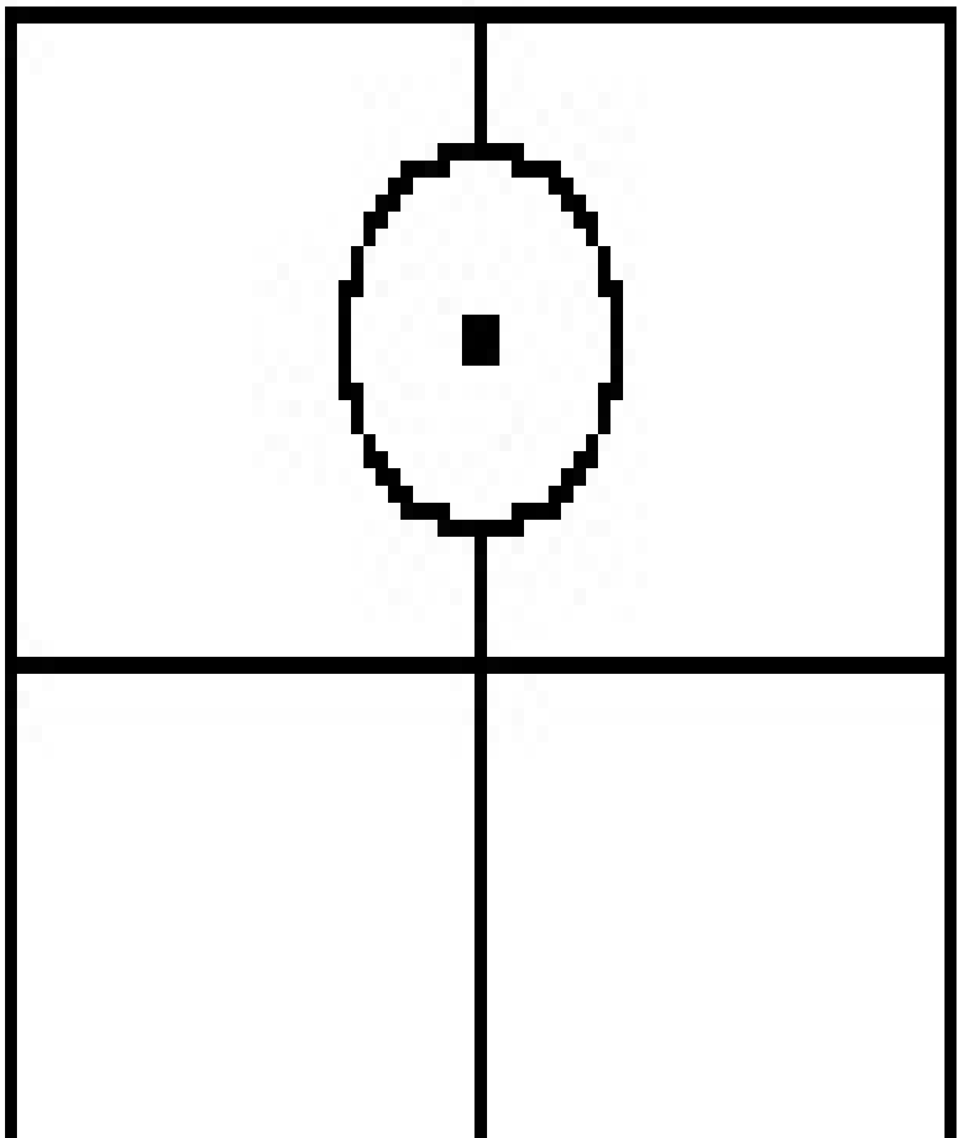
[Thus, “Some xy′ exist”, “No x′ are y”, &c., are said to be in terms of x and y.]

§ 2.

Representation of Propositions of Existence.

Let us take, first, the Proposition “Some x exist”.

[Note that this Proposition is (as explained at p. 12) equivalent to “Some existing Things are x-Things.”]



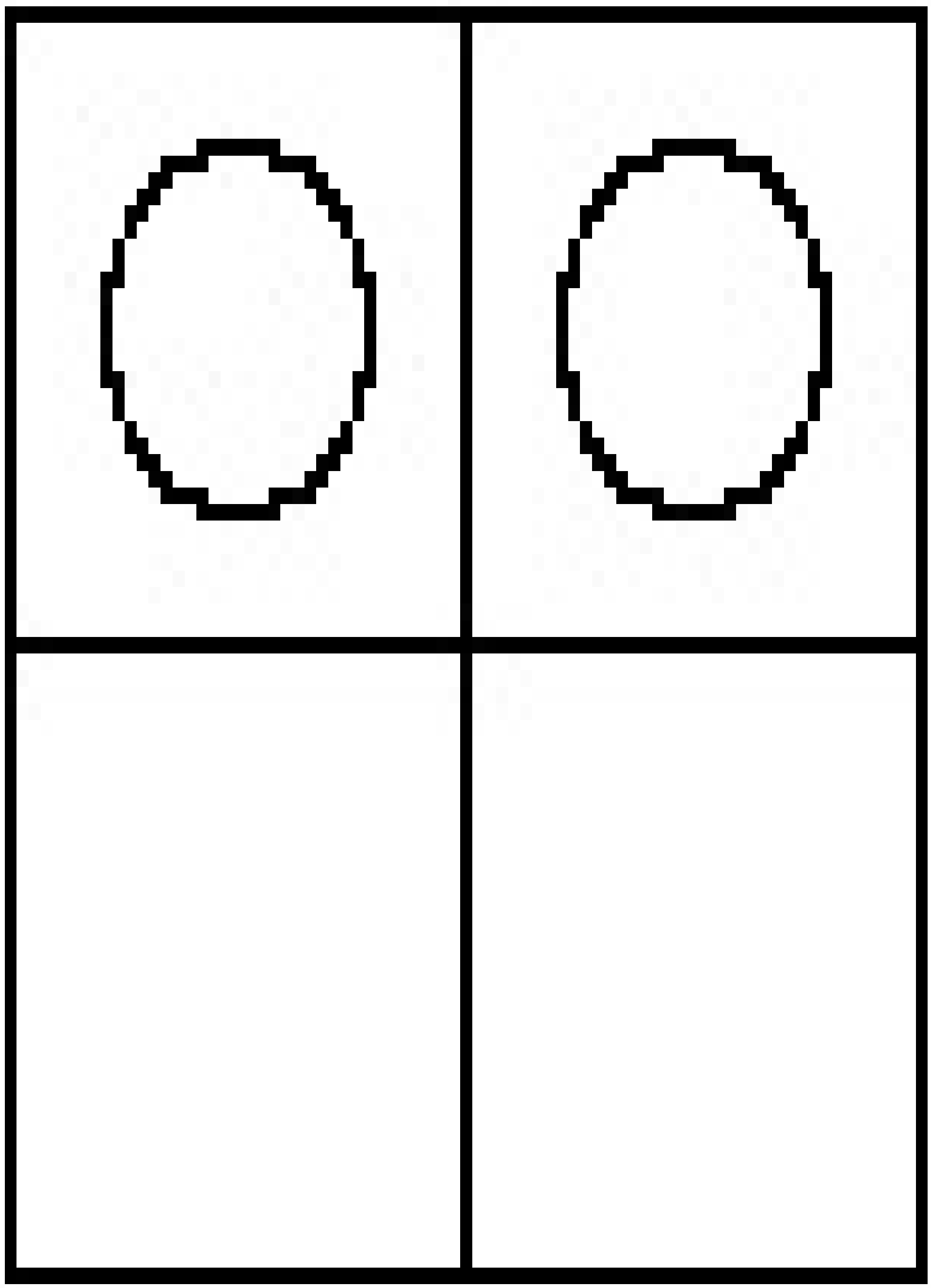
This tells us that there is at least one Thing in the North Half; that is, that the North Half is occupied. And this we can evidently represent by placing a Red Counter (here represented by a dotted circle) on the partition which divides the North Half.

[In the "books" example, this Proposition would be "Some old books exist".]

Similarly we may represent the three similar Propositions "Some x′ exist", "Some y exist", and "Some y′ exist".

[The Reader should make out all these for himself. In the "books" example, these Propositions would be "Some new books exist", &c.]

Let us take, next, the Proposition "No x exist".



This tells us that there is nothing in the North Half; that is, that the North Half is empty; that is, that the North-West Cell and the North-East Cell are both of them empty. And this we can represent by placing two Grey Counters in the North Half, one in each Cell.

[The Reader may perhaps think that it would be enough to place a Grey Counter on the partition in the North Half, and that, just as a Red Counter, so placed, would mean "This Half is occupied", so a Grey one would mean "This Half is empty".

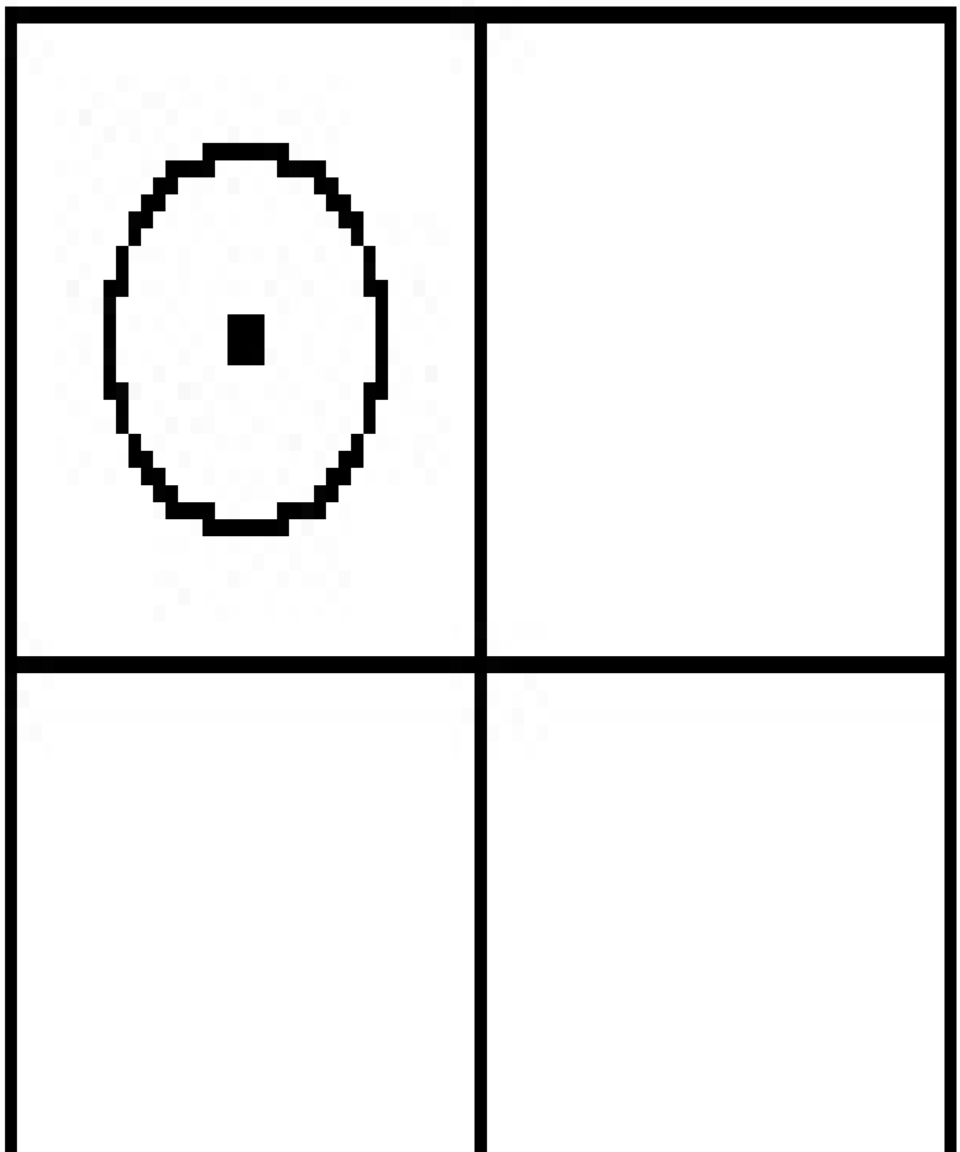
This, however, would be a mistake. We have seen that a Red Counter, so placed, would mean "At least one of these two Cells is occupied: possibly both are." Hence a Grey one would merely mean "At least one of these two Cells is empty: possibly both are". But what we have to represent is, that both Cells are certainly empty: and this can only be done by placing a Grey Counter in each of them.

In the "books" example, this Proposition would be "No old books exist".]

Similarly we may represent the three similar Propositions "No x′ exist", "No y exist", and "No y′ exist".

[The Reader should make out all these for himself. In the "books" example, these three Propositions would be "No new books exist", &c.]

Let us take, next, the Proposition "Some xy exist".



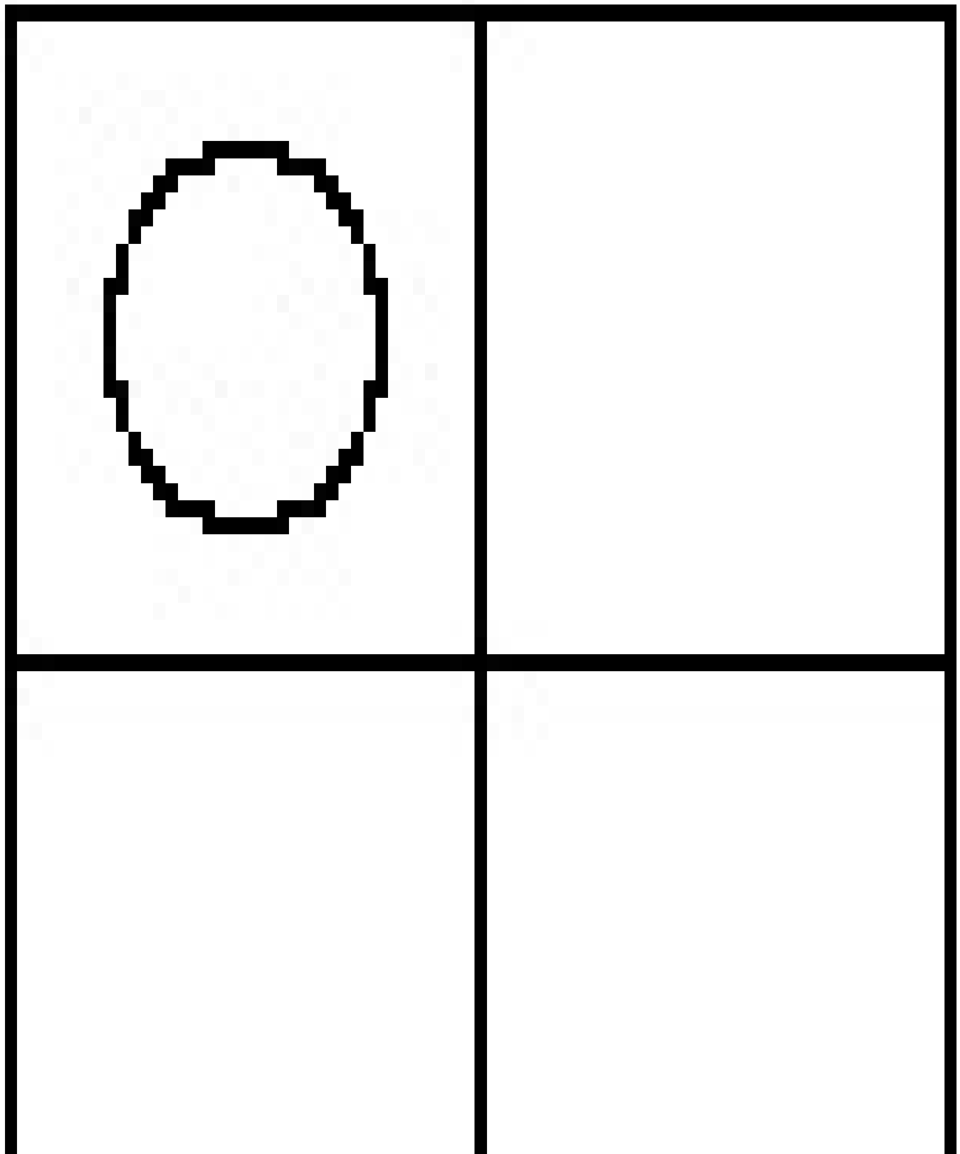
This tells us that there is at least one Thing in the North-West Cell; that is, that the North-West Cell is occupied. And this we can represent by placing a Red Counter in it.

[In the "books" example, this Proposition would be "Some old English books exist".]

Similarly we may represent the three similar Propositions "Some xy′ exist", "Some x′y exist", and "Some x′y′ exist".

[The Reader should make out all these for himself. In the "books" example, these three Propositions would be "Some old foreign books exist", &c.]

Let us take, next, the Proposition "No xy exist".

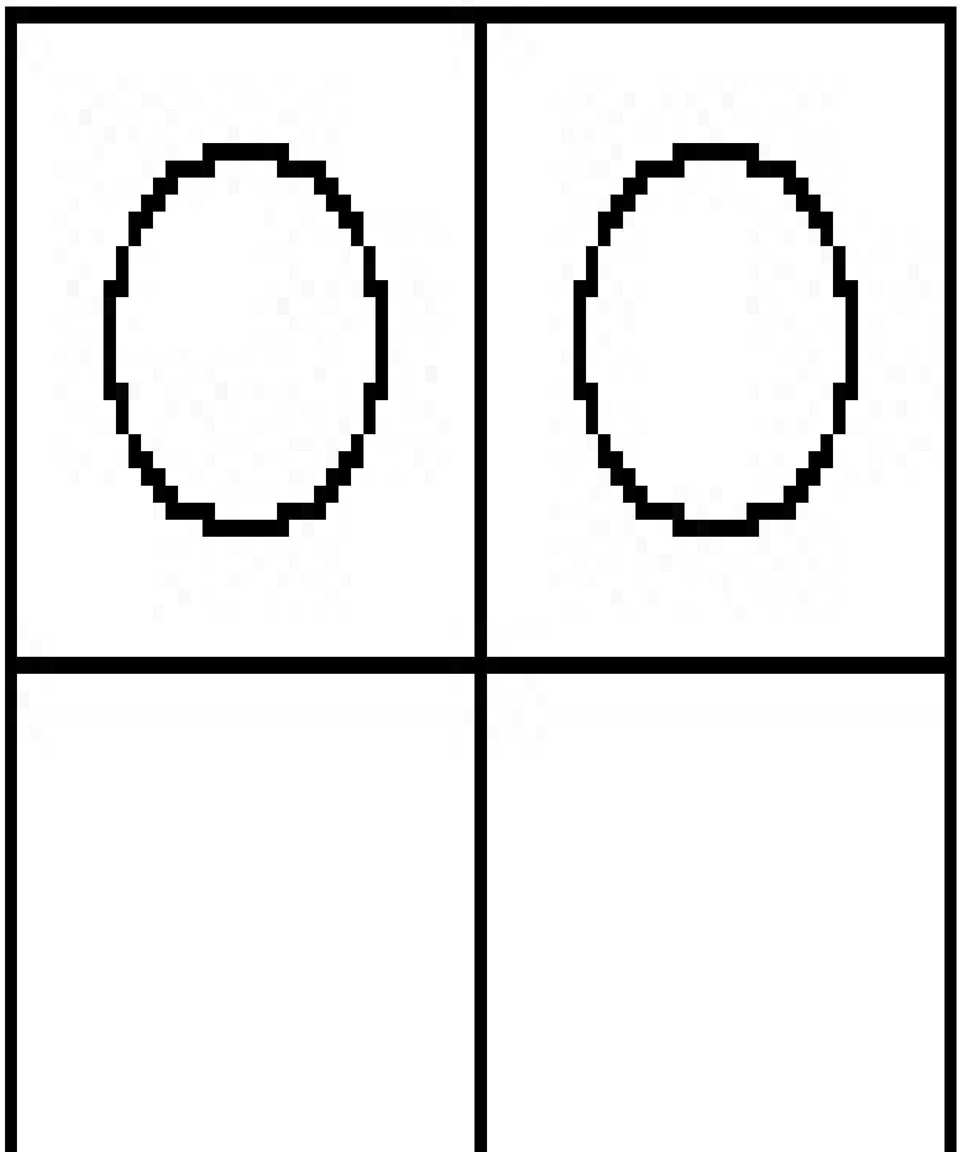


This tells us that there is nothing in the North-West Cell; that is, that the North-West Cell is empty. And this we can represent by placing a Grey Counter in it.

[In the “books” example, this Proposition would be “No old English books exist”.]

Similarly we may represent the three similar Propositions “No xy' exist”, “No $x'y$ exist”, and “No $x'y'$ exist”.

[The Reader should make out all these for himself. In the “books” example, these three Propositions would be “No old foreign books exist”, &c.]



We have seen that the Proposition “No x exist” may be represented by placing two Grey Counters in the North Half, one in each Cell.

We have also seen that these two Grey Counters, taken separately, represent the two Propositions “No xy exist” and “No xy′ exist”.

Hence we see that the Proposition “No x exist” is a Double Proposition, and is equivalent to the two Propositions “No xy exist” and “No xy′ exist”.

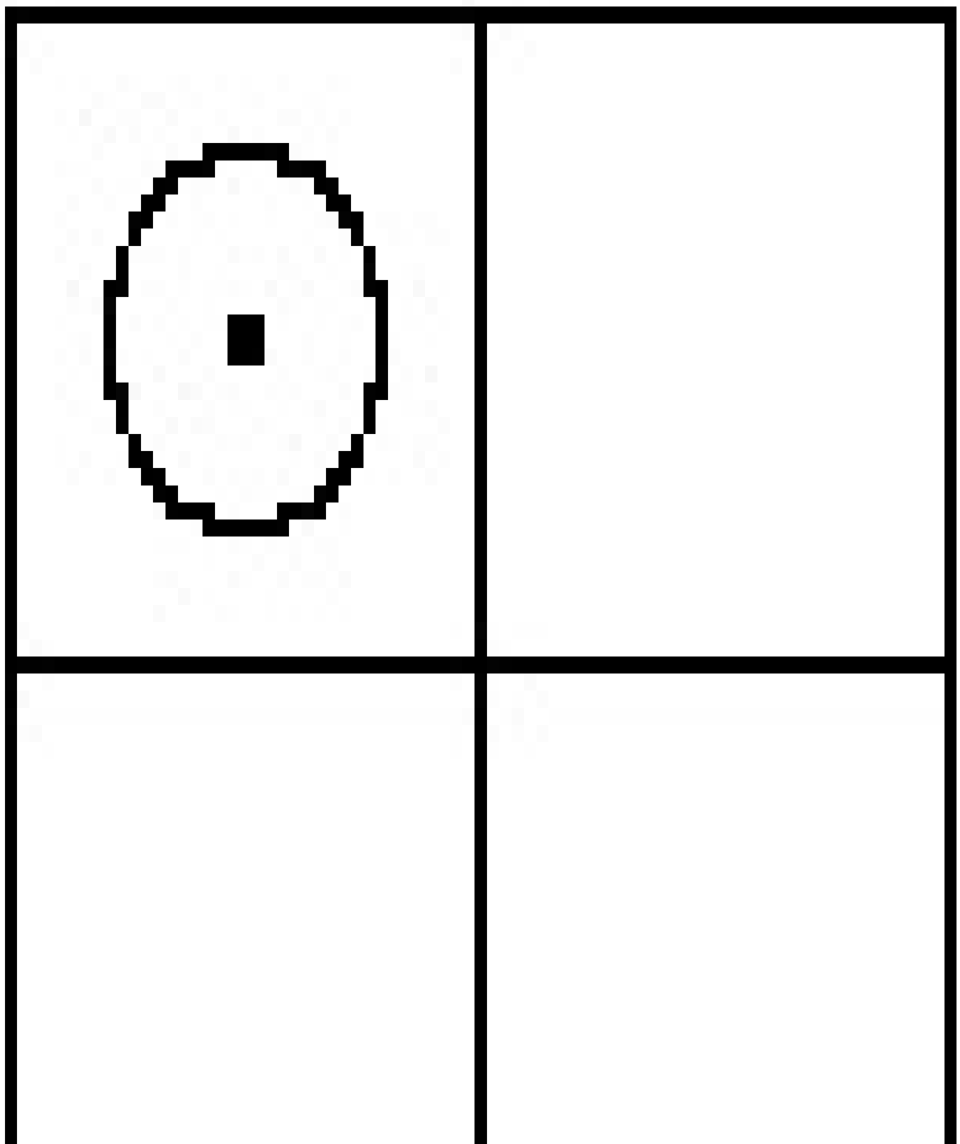
[In the “books” example, this Proposition would be “No old books exist”.

Hence this is a Double Proposition, and is equivalent to the two Propositions “No old English books exist” and “No old foreign books exist”.]

§ 3.

Representation of Propositions of Relation.

Let us take, first, the Proposition “Some x are y”.



This tells us that at least one Thing, in the North Half, is also in the West Half. Hence it must be in the space common to them, that is, in the North-West Cell. Hence the North-West Cell is occupied. And this we can represent by placing a Red Counter in it.

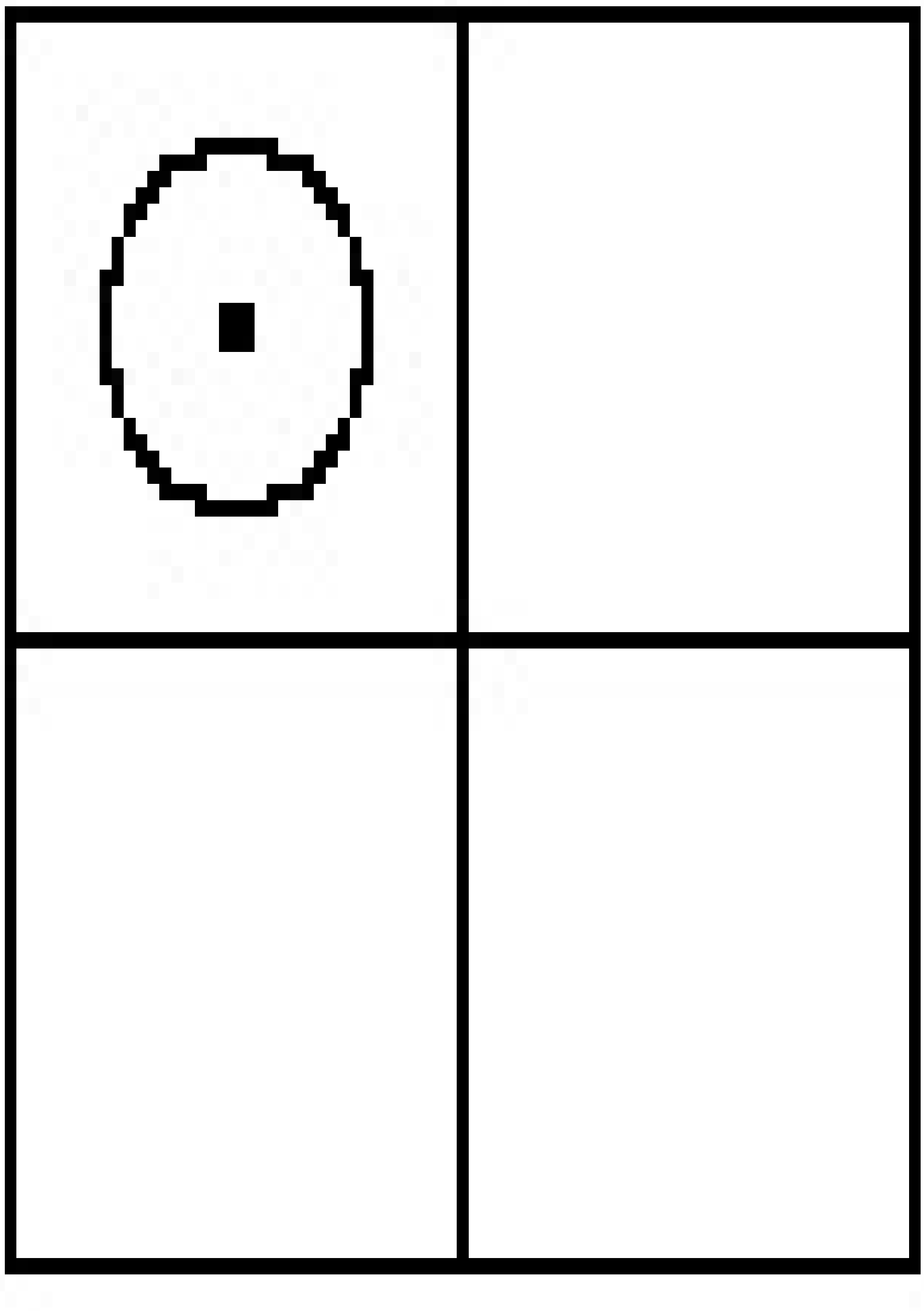
[Note that the Subject of the Proposition settles which Half we are to use; and that the Predicate settles in which portion of it we are to place the Red Counter.

In the “books” example, this Proposition would be “Some old books are English”.]

Similarly we may represent the three similar Propositions “Some x are y′”, “Some x′ are y”, and “Some x′ are y′”.

[The Reader should make out all these for himself. In the “books” example, these three Propositions would be “Some old books are foreign”, &c.]

Let us take, next, the Proposition “Some y are x”.

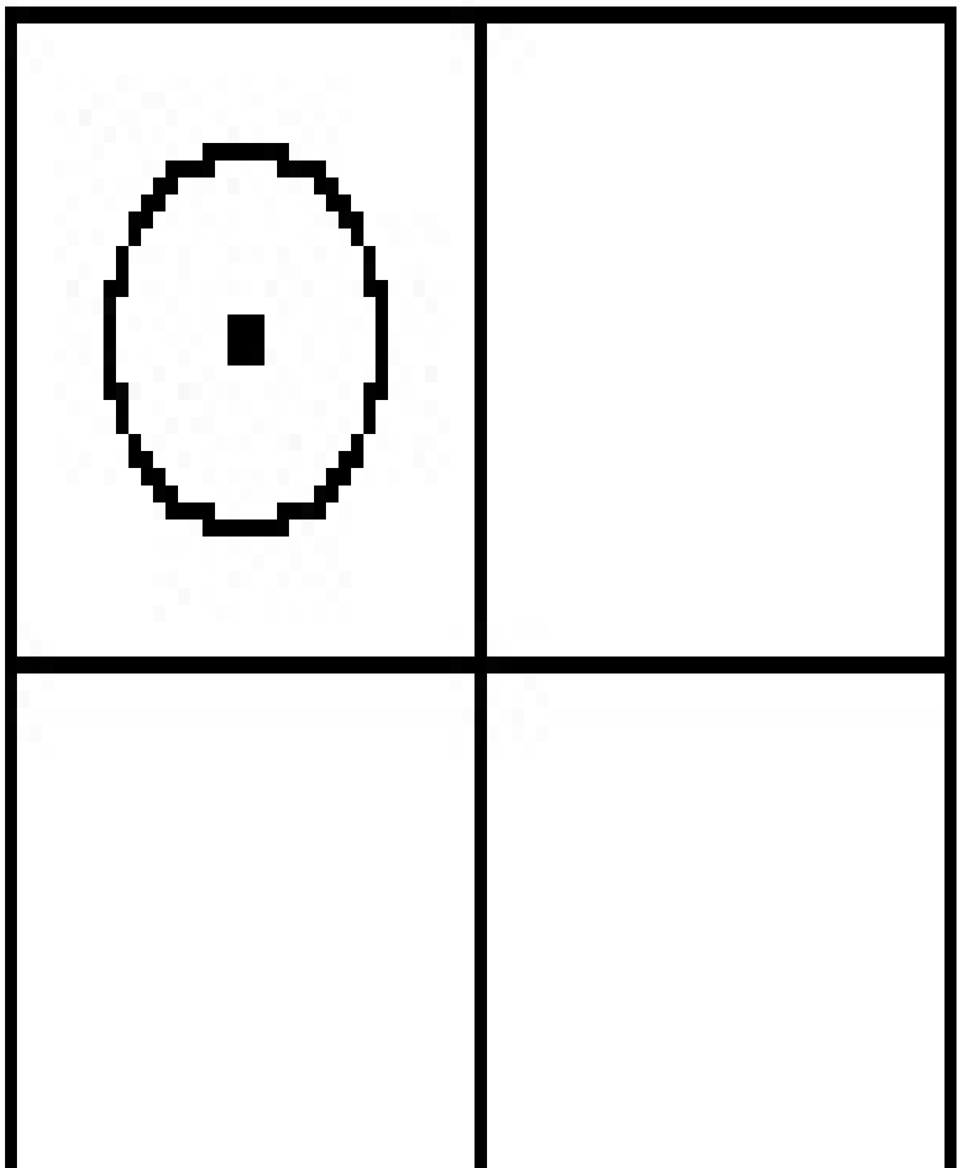


This tells us that at least one Thing, in the West Half, is also in the North Half. Hence it must be in the space common to them, that is, in the North-West Cell. Hence the North-West Cell is occupied. And this we can represent by placing a Red Counter in it.

[In the “books” example, this Proposition would be “Some English books are old”.]

Similarly we may represent the three similar Propositions “Some y are x′”, “Some y′ are x”, and “Some y′ are x′”.

[The Reader should make out all these for himself. In the “books” example, these three Propositions would be “Some English books are new”, &c.]



We see that this one Diagram has now served to represent no less than three Propositions, viz.

(1) “Some xy exist;

(2) Some x are y;

(3) Some y are x”.

Hence these three Propositions are equivalent.

[In the “books” example, these Propositions would be

(1) “Some old English books exist;

(2) Some old books are English;

(3) Some English books are old”.]

The two equivalent Propositions, “Some x are y” and “Some y are x”, are said to be ‘Converse’ to each other; and the Process, of changing one into the other, is called ‘Converting’, or ‘Conversion’.

[For example, if we were told to convert the Proposition

“Some apples are not ripe,”

we should first choose our Univ. (say “fruit”), and then complete the Proposition, by supplying the Substantive “fruit” in the Predicate, so that it would be

“Some apples are not-ripe fruit”;

and we should then convert it by interchanging its Terms, so that it would be

“Some not-ripe fruit are apples”.]

Similarly we may represent the three similar Trios of equivalent Propositions; the whole Set of four Trios being as follows:—

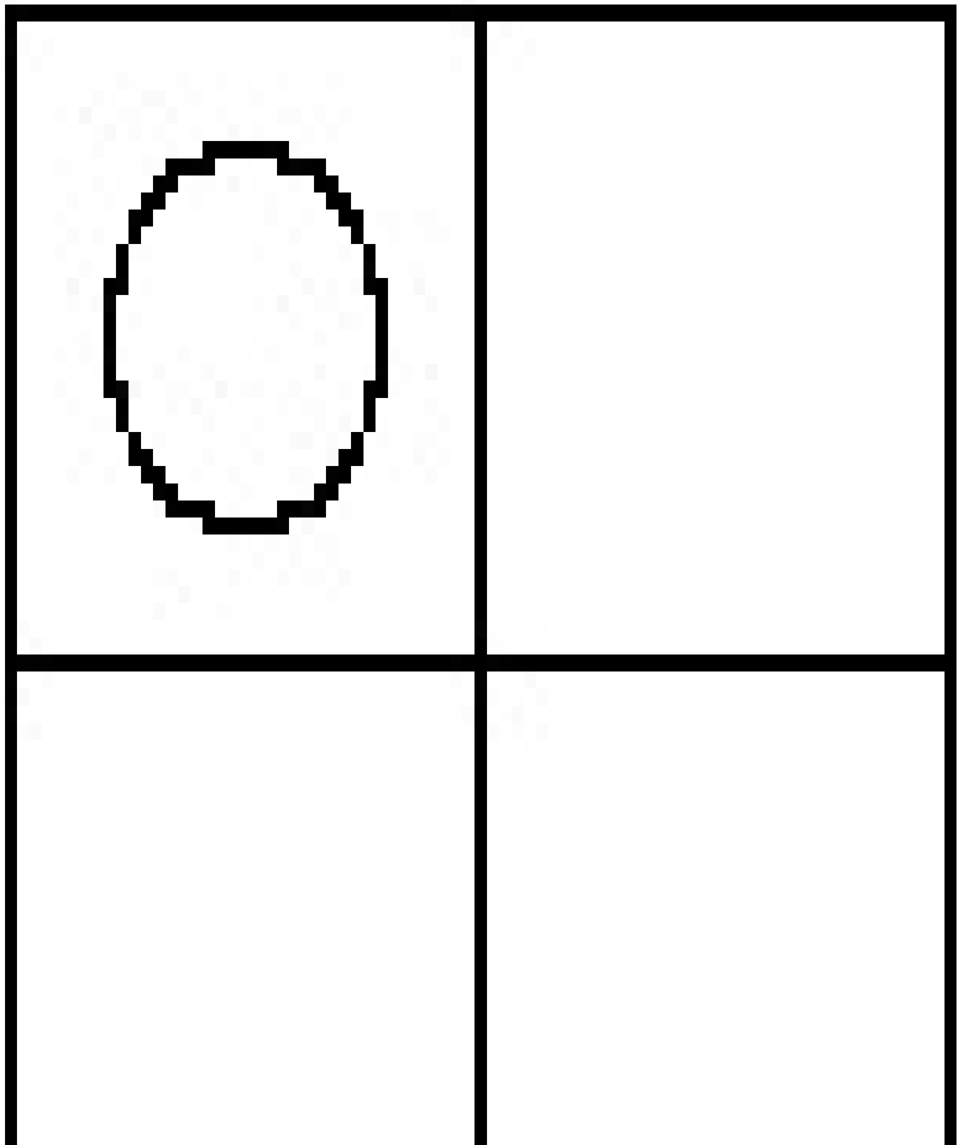
(1) “Some xy exist” = “Some x are y” = “Some y are x”.

(2) “Some xy′ exist” = “Some x are y′” = “Some y′ are x”.

(3) “Some x′y exist” = “Some x′ are y” = “Some y are x′”.

(4) “Some x′y′ exist” = “Some x′ are y′” = “Some y′ are x′”.

Let us take, next, the Proposition “No x are y”.



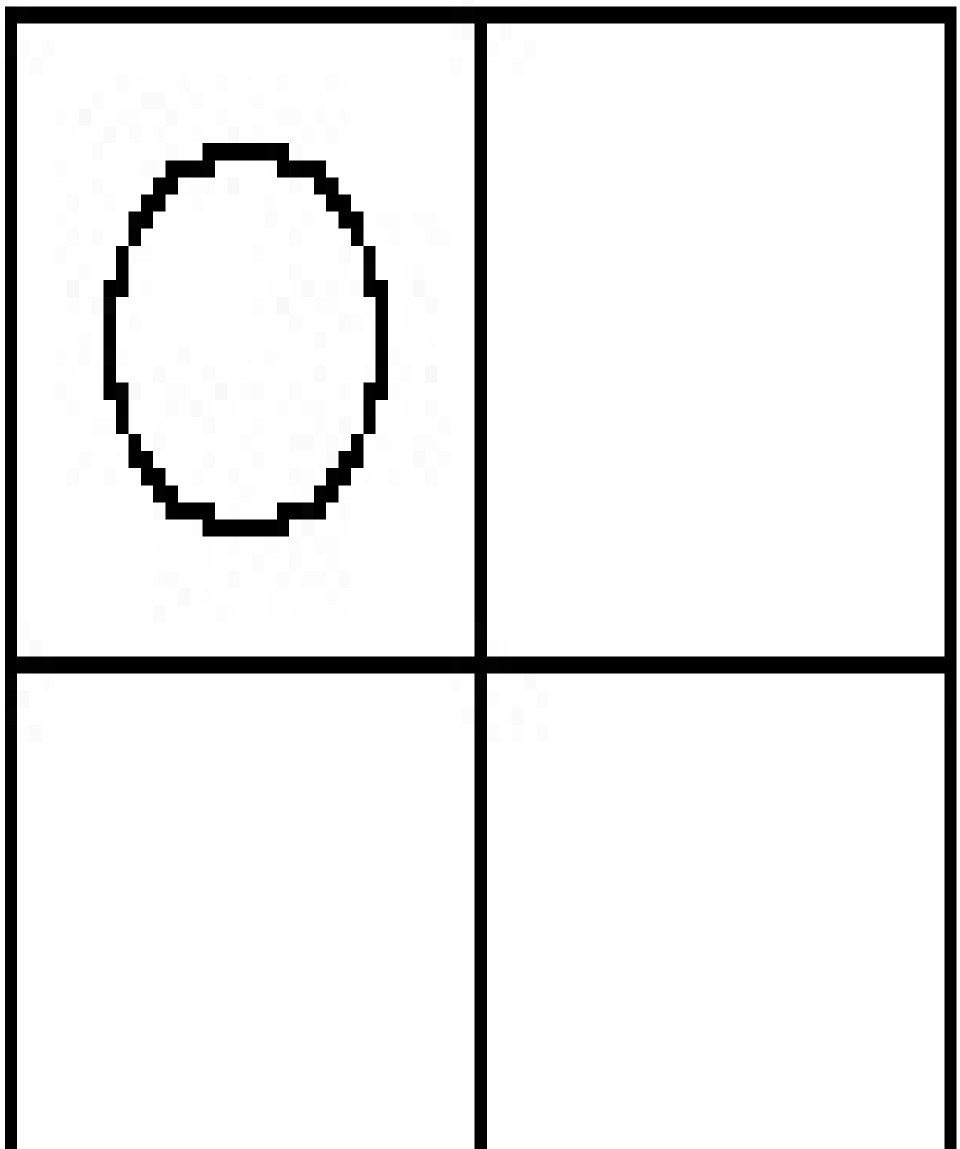
This tell us that no Thing, in the North Half, is also in the West Half. Hence there is nothing in the space common to them, that is, in the North-West Cell. Hence the North-West Cell is empty. And this we can represent by placing a Grey Counter in it.

[In the “books” example, this Proposition would be “No old books are English”.]

Similarly we may represent the three similar Propositions “No x are y′”, and “No x′ are y”, and “No x′ are y′”.

[The Reader should make out all these for himself. In the “books” example, these three Propositions would be “No old books are foreign”, &c.]

Let us take, next, the Proposition “No y are x”.

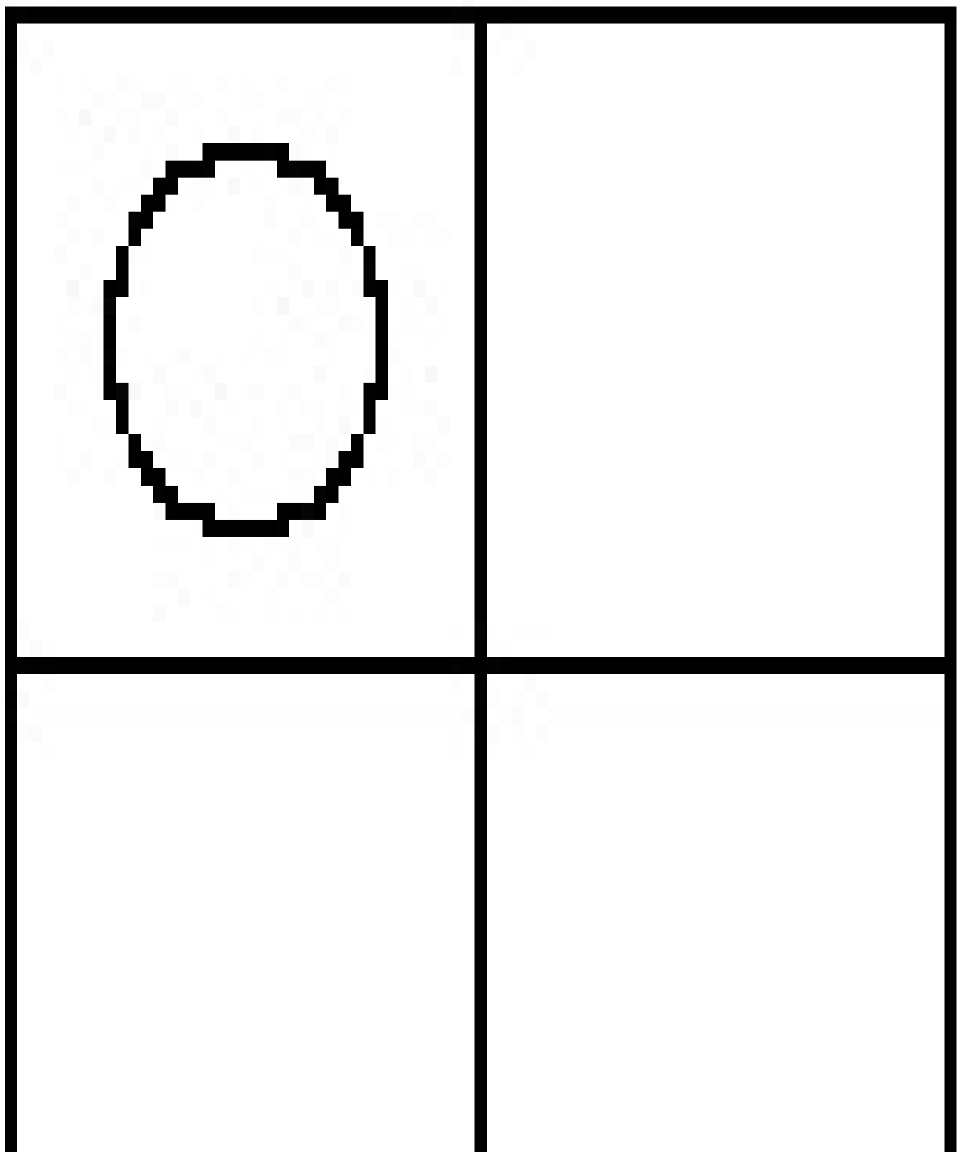


This tells us that no Thing, in the West Half, is also in the North Half. Hence there is nothing in the space common to them, that is, in the North-West Cell. That is, the North-West Cell is empty. And this we can represent by placing a Grey Counter in it.

[In the “books” example, this Proposition would be “No English books are old”.]

Similarly we may represent the three similar Propositions “No y are x′”, “No y′ are x”, and “No y′ are x′”.

[The Reader should make out all these for himself. In the “books” example, these three Propositions would be “No English books are new”, &c.]



We see that this one Diagram has now served to present no less than three Propositions, viz.

(1) “No xy exist;

(2) No x are y;

(3) No y are x.”

Hence these three Propositions are equivalent.

[In the “books” example, these Propositions would be

(1) “No old English books exist;

(2) No old books are English;

(3) No English books are old”.]

The two equivalent Propositions, “No x are y” and “No y are x”, are said to be ‘Converse’ to each other.

[For example, if we were told to convert the Proposition

“No porcupines are talkative”,

we should first choose our Univ. (say “animals”), and then complete the

Proposition, by supplying the Substantive “animals” in the Predicate, so that it would be

“No porcupines are talkative animals”, and we should then convert it, by interchanging its Terms, so that it would be

“No talkative animals are porcupines”.]

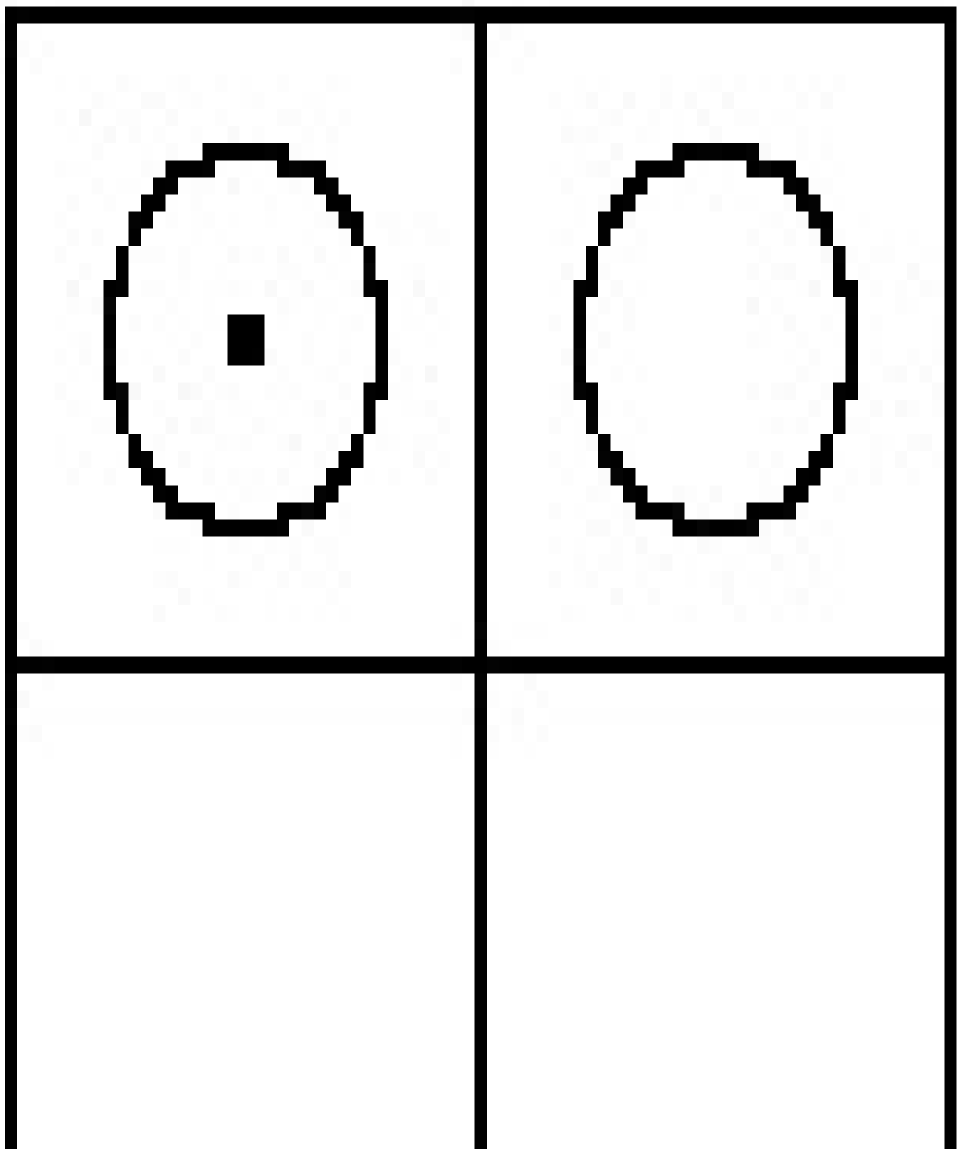
Similarly we may represent the three similar Trios of equivalent Propositions; the whole Set of four Trios being as follows:—

(1) “No xy exist” = “No x are y” = “No y are x”.

(2) “No xy' exist” = “No x are y'” = “No y' are x”.

(3) “No $x'y$ exist” = “No x' are y” = “No y are x'”.

(4) “No $x'y'$ exist” = “No x' are y'” = “No y' are x'”.



Let us take, next, the Proposition “All x are y”.

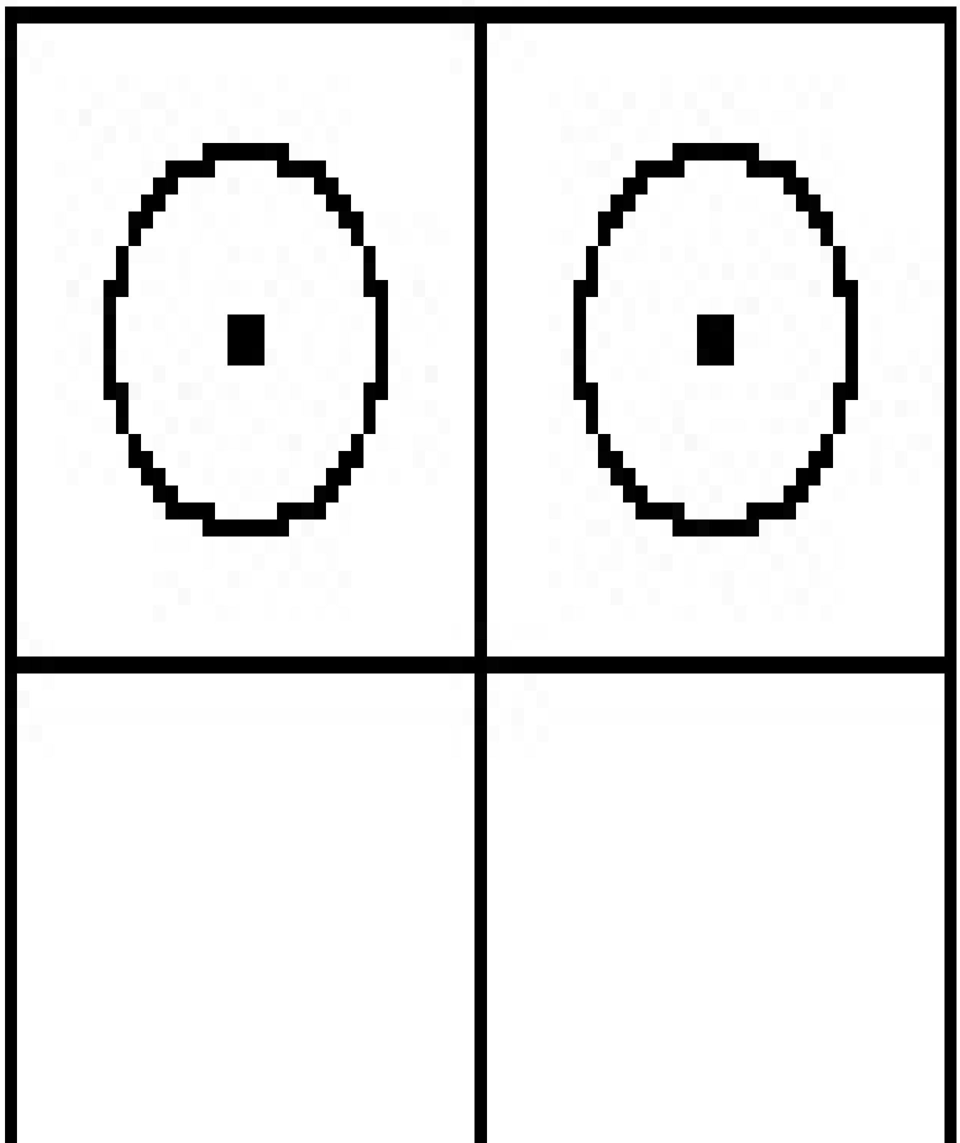
We know (see p. 17) that this is a Double Proposition, and equivalent to the two Propositions “Some x are y” and “No x are y′”, each of which we already know how to represent.

[Note that the Subject of the given Proposition settles which Half we are to use; and that its Predicate settles in which portion of that Half we are to place the Red Counter.]

TABLE II.

Some x exist		No x exist	
Some x′ exist		No x′ exist	
Some y exist		No y exist	
Some y′ exist		No y′ exist	

Similarly we may represent the seven similar Propositions “All x are y′”, “All x′ are y”, “All x′ are y′”, “All y are x”, “All y are x′”, “All y′ are x”, and “All y′ are x′”.



Let us take, lastly, the Double Proposition “Some x are y and some are y′”, each part of which we already know how to represent.

Similarly we may represent the three similar Propositions, “Some x′ are y and some are y′”, “Some y are x and some are x′”, “Some y′ are x and some are x′”.

The Reader should now get his genial friend to question him, severely, on these two Tables. The Inquisitor should have the Tables before him: but the Victim should have nothing but a blank Diagram, and the Counters with which he is to represent the various Propositions named by his friend, e.g. “Some y exist”, “No y′ are x”, “All x are y”, &c. &c.

TABLE III.

Some xy exist = Some x are y = Some y are x		All x are y
Some xy′ exist = Some x are y′ = Some y′ are x		All x are y′
Some x′y exist = Some x′ are y = Some y are x′		All x′ are y
Some x′y′ exist = Some x′ are y′ = Some y′ are x′		All x′ are y′
No xy exist = No x are y = No y are x		All y are x
No xy′ exist = No x are y′ = No y′ are x		All y are x′
No x′y exist = No x′ are y = No y are x′		All y′ are x

No x′y′ exist = No x′ are y′ = No y′ are x′		All y′ are x′
Some x are y, and some are y′		Some y are x and s
Some x′ are y, and some are y′		Some y′ are x and

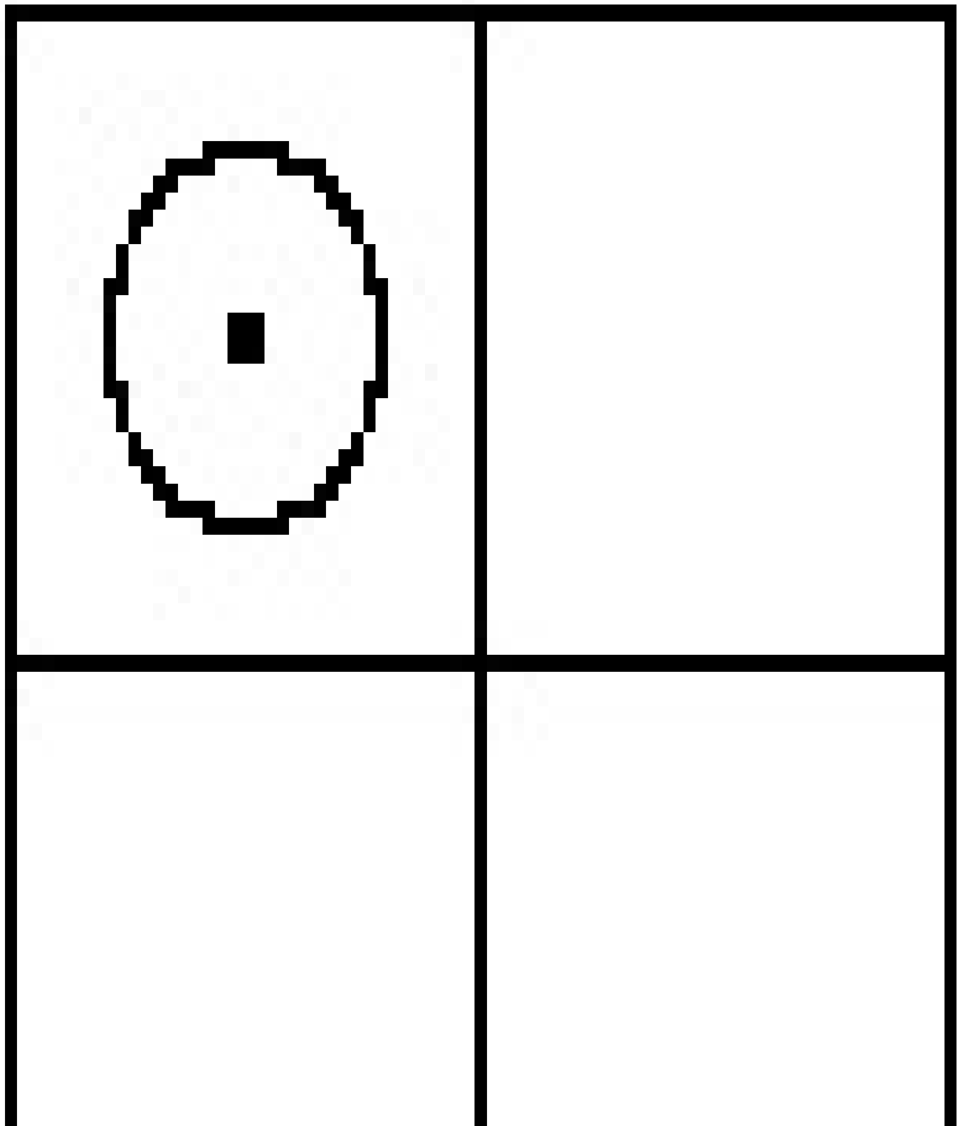
CHAPTER IV.

INTERPRETATION OF BILITERAL DIAGRAM WHEN MARKED WITH COUNTERS.

Table of Contents

The Diagram is supposed to be set before us, with certain Counters placed upon it; and the problem is to find out what Proposition, or Propositions, the Counters represent.

As the process is simply the reverse of that discussed in the previous Chapter, we can avail ourselves of the results there obtained, as far as they go.

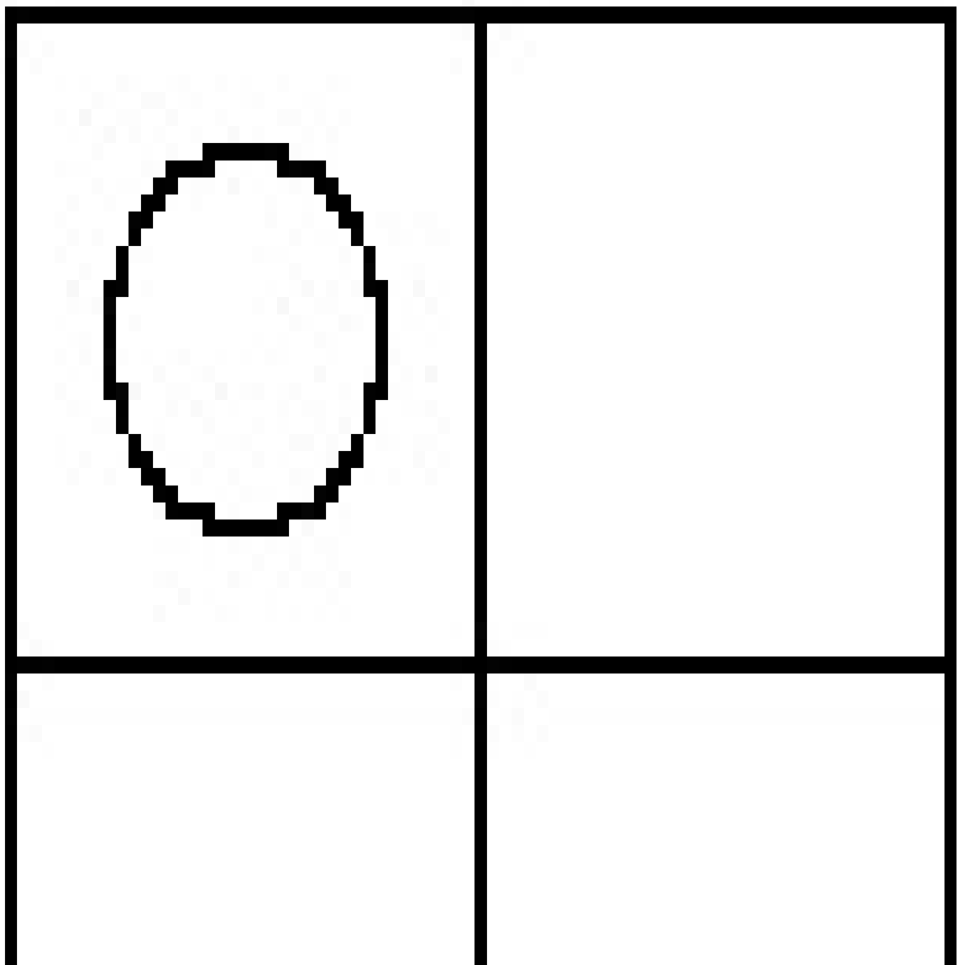


First, let us suppose that we find a Red Counter placed in the North-West Cell.

We know that this represents each of the Trio of equivalent Propositions

“Some xy exist” = “Some x are y” = “Some y are x”.

Similarly we may interpret a Red Counter, when placed in the North-East, or South-West, or South-East Cell.

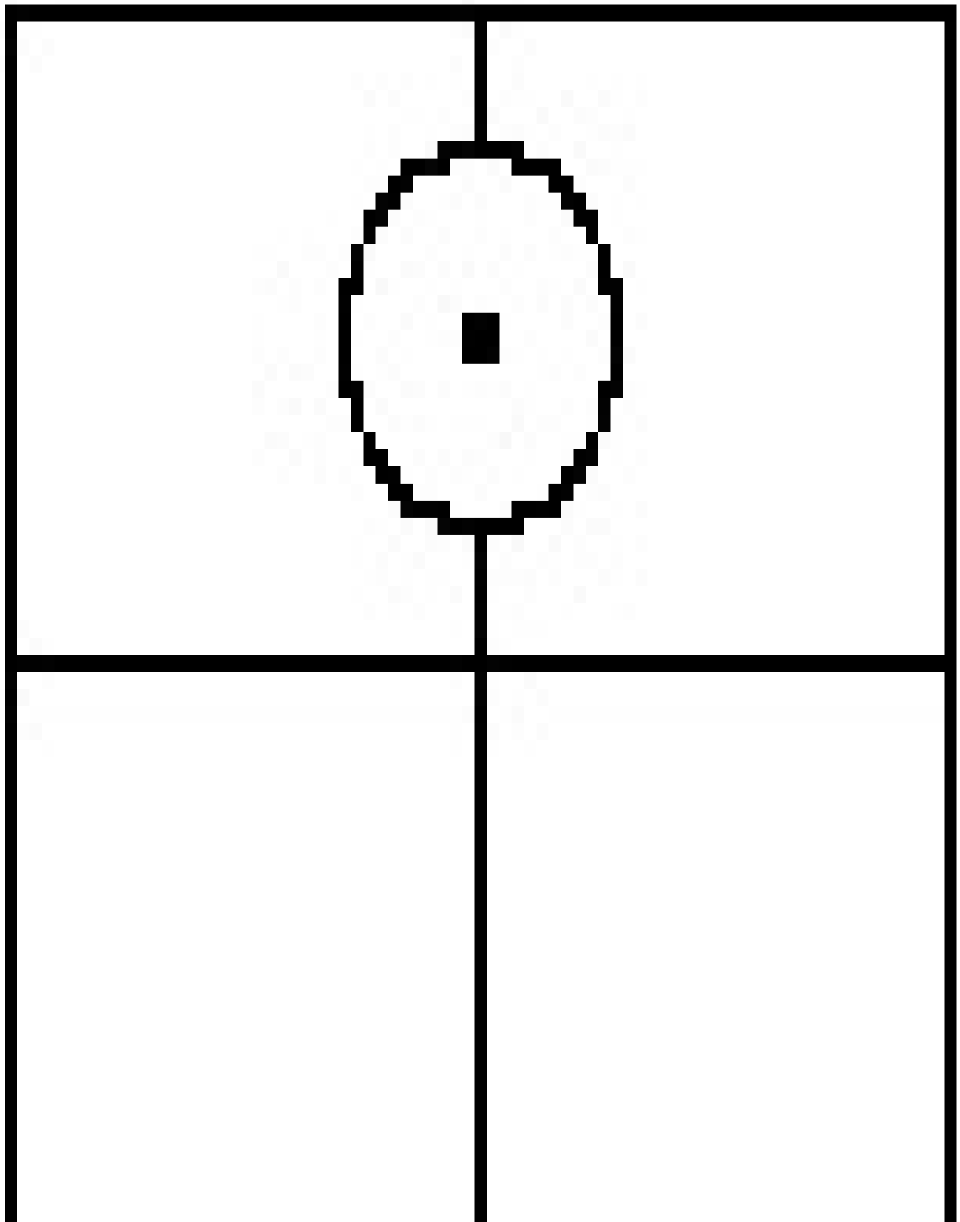


Next, let us suppose that we find a Grey Counter placed in the North-West Cell.

We know that this represents each of the Trio of equivalent Propositions

“No xy exist” = “No x are y” = “No y are x”.

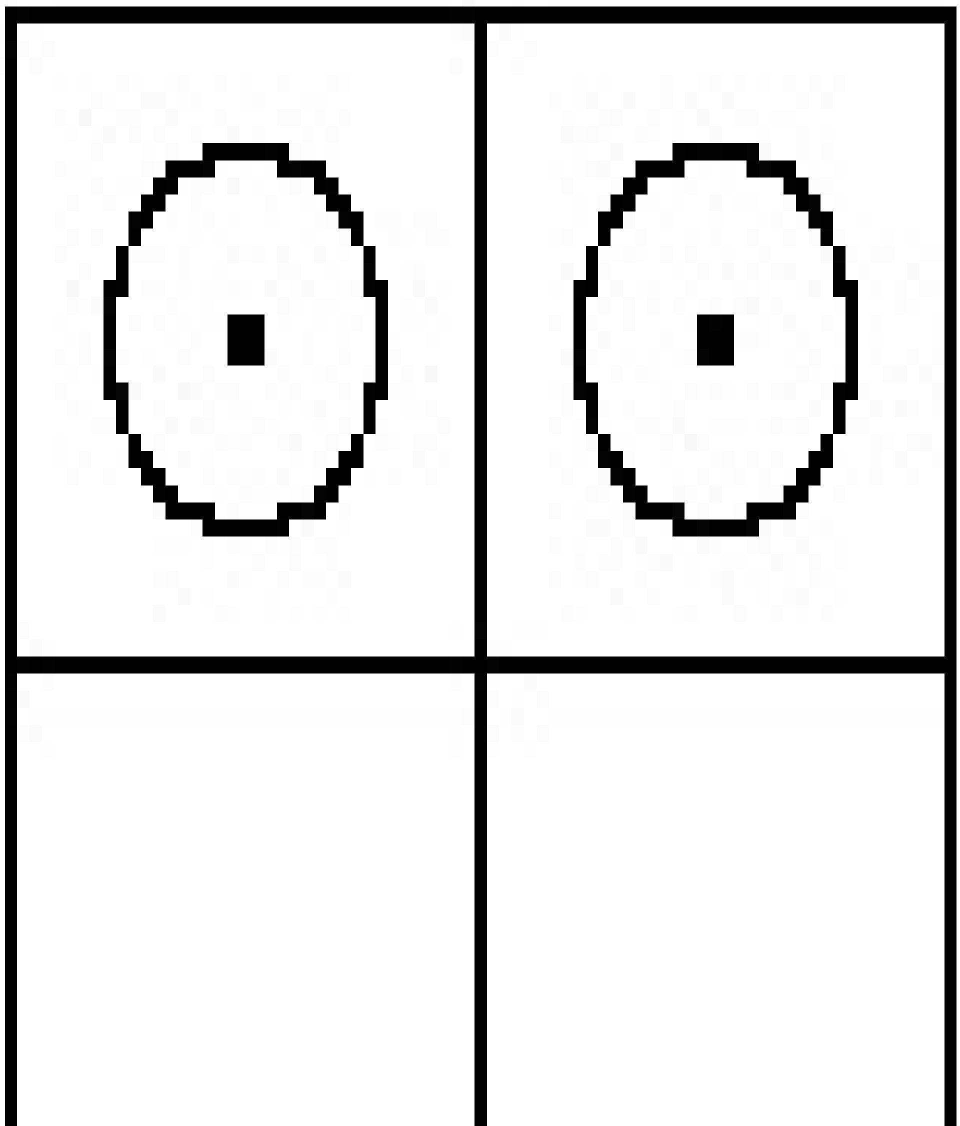
Similarly we may interpret a Grey Counter, when placed in the North-East, or South-West, or South-East Cell.



Next, let us suppose that we find a Red Counter placed on the partition which divides the North Half.

We know that this represents the Proposition “Some x exist.”

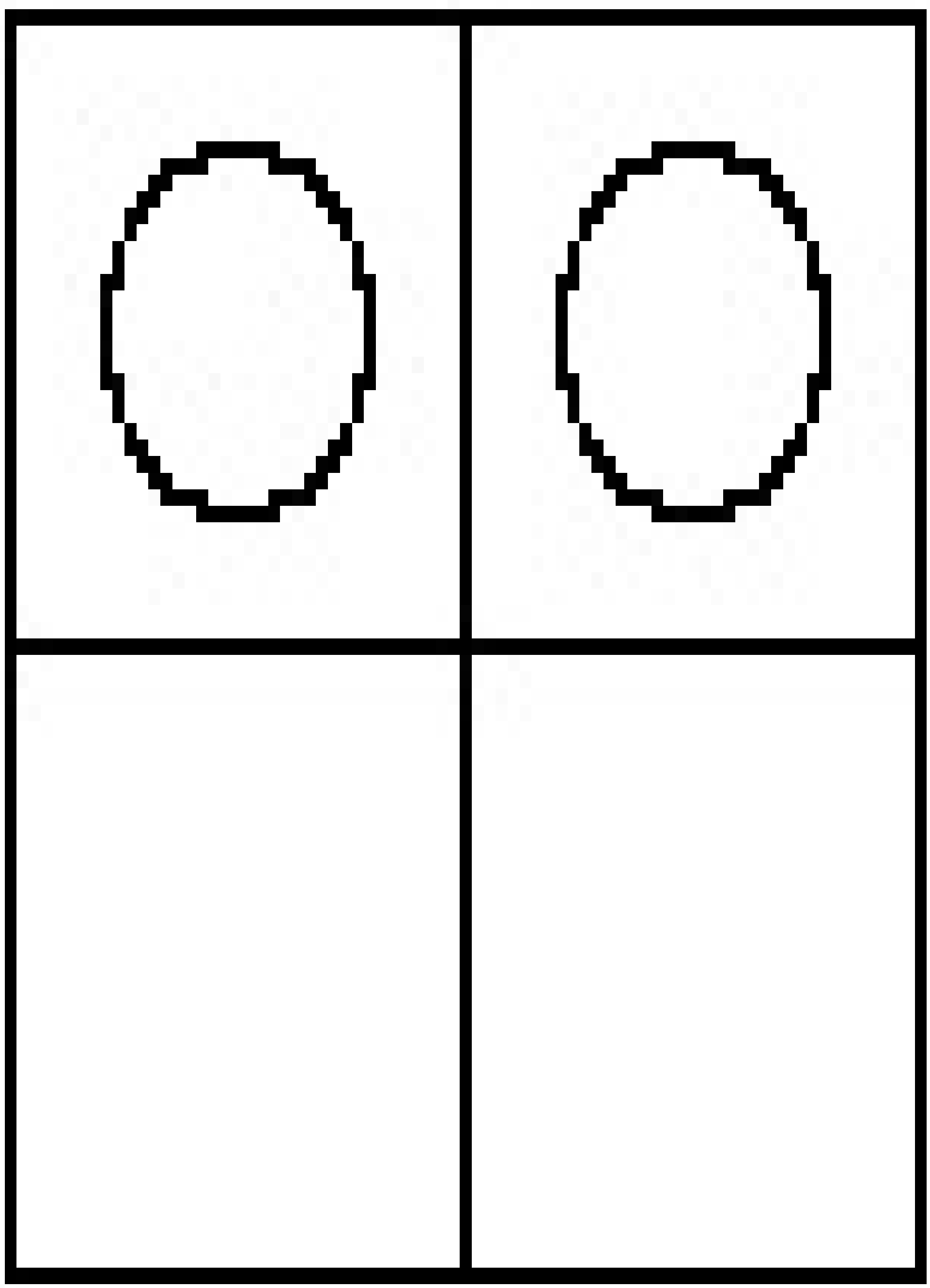
Similarly we may interpret a Red Counter, when placed on the partition which divides the South, or West, or East Half.



Next, let us suppose that we find two Red Counters placed in the North Half, one in each Cell.

We know that this represents the Double Proposition “Some x are y and some are y′”.

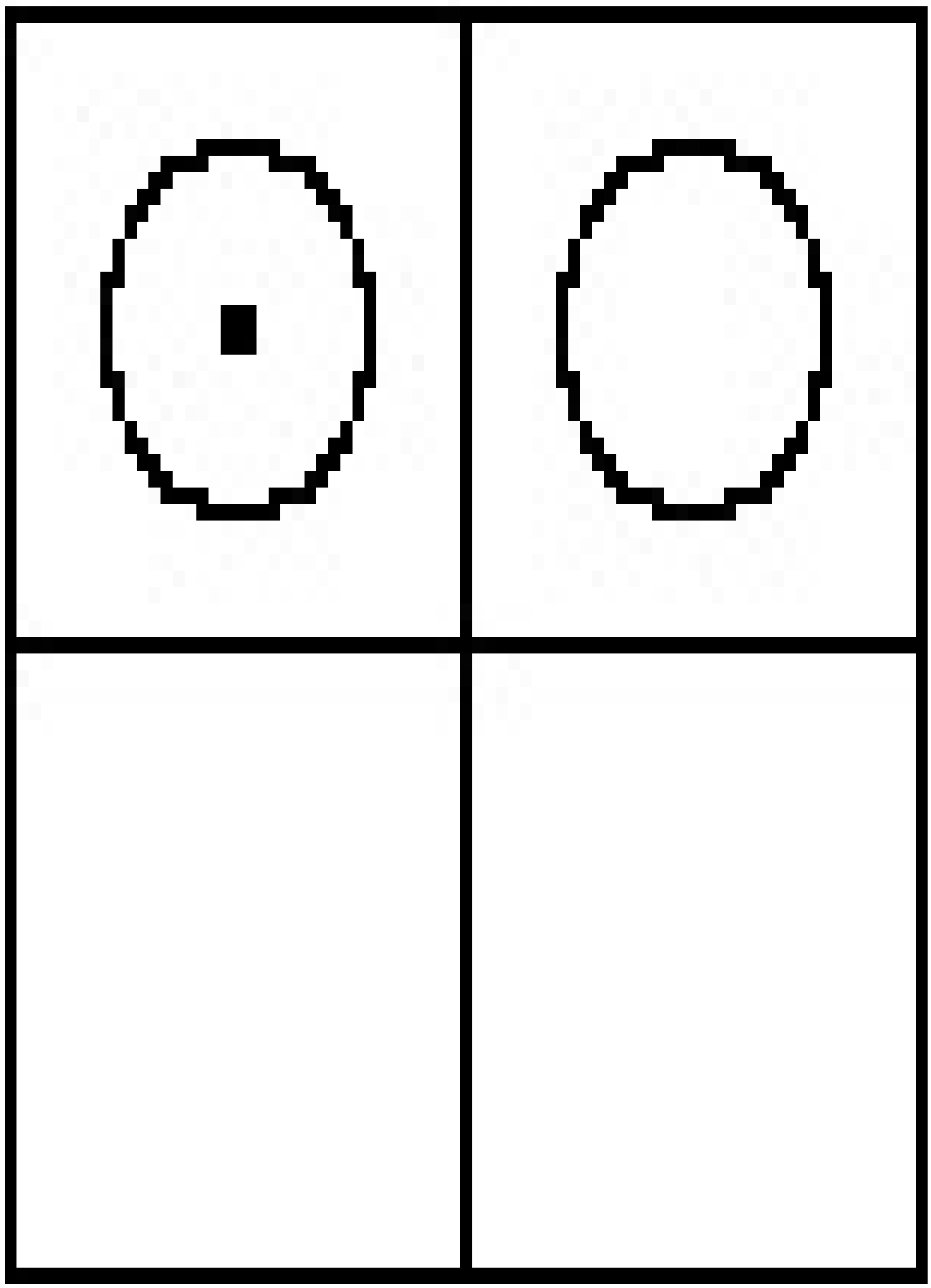
Similarly we may interpret two Red Counters, when placed in the South, or West, or East Half.



Next, let us suppose that we find two Grey Counters placed in the North Half, one in each Cell.

We know that this represents the Proposition “No x exist”.

Similarly we may interpret two Grey Counters, when placed in the South, or West, or East Half.



Lastly, let us suppose that we find a Red and a Grey Counter placed in the North Half, the Red in the North-West Cell, and the Grey in the North-East Cell.

We know that this represents the Proposition, “All x are y”.

[Note that the Half, occupied by the two Counters, settles what is to be the Subject of the Proposition, and that the Cell, occupied by the Red Counter, settles what is to be its Predicate.]

Similarly we may interpret a Red and a Grey counter, when placed in any one of the seven similar positions

Red in North-East, Grey in North-West;

Red in South-West, Grey in South-East;

Red in South-East, Grey in South-West;

Red in North-West, Grey in South-West;

Red in South-West, Grey in North-West;

Red in North-East, Grey in South-East;

Red in South-East, Grey in North-East.

Once more the genial friend must be appealed to, and requested to examine the Reader on Tables II and III, and to make him not only represent Propositions, but also interpret Diagrams when marked with Counters.

The Questions and Answers should be like this:—

Q. Represent “No x′ are y′.”

A. Grey Counter in S.E. Cell.

Q. Interpret Red Counter on E. partition.

A. “Some y′ exist.”

Q. Represent “All y′ are x.”

A. Red in N.E. Cell; Grey in S.E.

Q. Interpret Grey Counter in S.W. Cell.

A. “No x′y exist” = “No x′ are y” = “No y are x′”.

&c., &c.

At first the Examinee will need to have the Board and Counters before him; but he will soon learn to dispense with these, and to answer with his eyes shut or gazing into vacancy.

[Work Examples § 1, 5–8 (p. 97).]

BOOK IV.

THE TRILITERAL DIAGRAM.

CHAPTER I.

SYMBOLS AND CELLS.

Table of Contents

First, let us suppose that the above left-hand Diagram is the Biliteral Diagram that we have been using in Book III., and that we change it into a Triliteral Diagram by drawing an Inner Square, so as to divide each of its 4 Cells into 2 portions, thus making 8 Cells altogether. The right-hand Diagram shows the result.

[The Reader is strongly advised, in reading this Chapter, not to refer to the above Diagrams, but to make a large copy of the right-hand one for himself, without any letters, and to have it by him while he reads, and keep his finger on that particular part of it, about which he is reading.]

Secondly, let us suppose that we have selected a certain Adjunct, which we may call "m", and have subdivided the xy-Class into the two Classes whose Differentiæ are m and m′, and that we have assigned the N.W. Inner Cell to the one (which we may call "the Class of xym-Things", or "the xym-Class"), and the N.W. Outer Cell to the other (which we may call "the Class of xym′-Things", or "the xym′-Class").

[Thus, in the "books" example, we might say "Let m mean 'bound', so that m′ will mean 'unbound'", and we might suppose that we had subdivided the Class "old English books" into the two Classes, "old English bound books" and "old English unbound books", and had assigned the N.W. Inner Cell to the one, and

the N.W. Outer Cell to the other.]

Thirdly, let us suppose that we have subdivided the xy′-Class, the x′y-Class, and the x′y′-Class in the same manner, and have, in each case, assigned the Inner Cell to the Class possessing the Attribute m, and the Outer Cell to the Class possessing the Attribute m′.

[Thus, in the “books” example, we might suppose that we had subdivided the “new English books” into the two Classes, “new English bound books” and “new English unbound books”, and had assigned the S.W. Inner Cell to the one, and the S.W. Outer Cell to the other.]

It is evident that we have now assigned the Inner Square to the m-Class, and the Outer Border to the m′-Class.

[Thus, in the “books” example, we have assigned the Inner Square to “bound books” and the Outer Border to “unbound books”.]

When the Reader has made himself familiar with this Diagram, he ought to be able to find, in a moment, the Compartment assigned to a particular pair of Attributes, or the Cell assigned to a particular trio of Attributes. The following Rules will help him in doing this:—

(1) Arrange the Attributes in the order x, y, m.

(2) Take the first of them and find the Compartment assigned to it.

(3) Then take the second, and find what portion of that compartment is assigned

to it.

(4) Treat the third, if there is one, in the same way.

[For example, suppose we have to find the Compartment assigned to ym. We say to ourselves “y has the West Half; and m has the Inner portion of that West Half.”

Again, suppose we have to find the Cell assigned to x′ym′. We say to ourselves “x′ has the South Half; y has the West portion of that South Half, i.e. has the South-West Quarter; and m′ has the Outer portion of that South-West Quarter.”]

The Reader should now get his genial friend to question him on the Table given on the next page, in the style of the following specimen-Dialogue.

Q. Adjunct for South Half, Inner Portion? A. x′m. Q. Compartment for m′? A.

TABLE IV.

Adjunct of Classes.	Compartments, or Cells, assigned to them.
x	North Half.
x′	South
y	West
y′	East
m	Inner Square.
m′	Outer Border.
xy	North-West Quarter.
xy′	East
x′y	South-West
x′y′	East

xm	North Half, Inner Portion.
xm′	Outer
x′m	South Inner
x′m′	Outer
ym	West Inner
ym′	Outer
y′m	East Inner
y′m′	Outer
xym	North-West Quarter, Inner Portion.
xym′	Outer
xy′m	East Inner
xy′m′	Outer
x′ym	South-West Inner
x′ym′	Outer

$x'y'm$	East Inner
$x'y'm'$	Outer

CHAPTER II.

REPRESENTATION OF PROPOSITIONS IN TERMS OF x AND m, OR OF y AND m.

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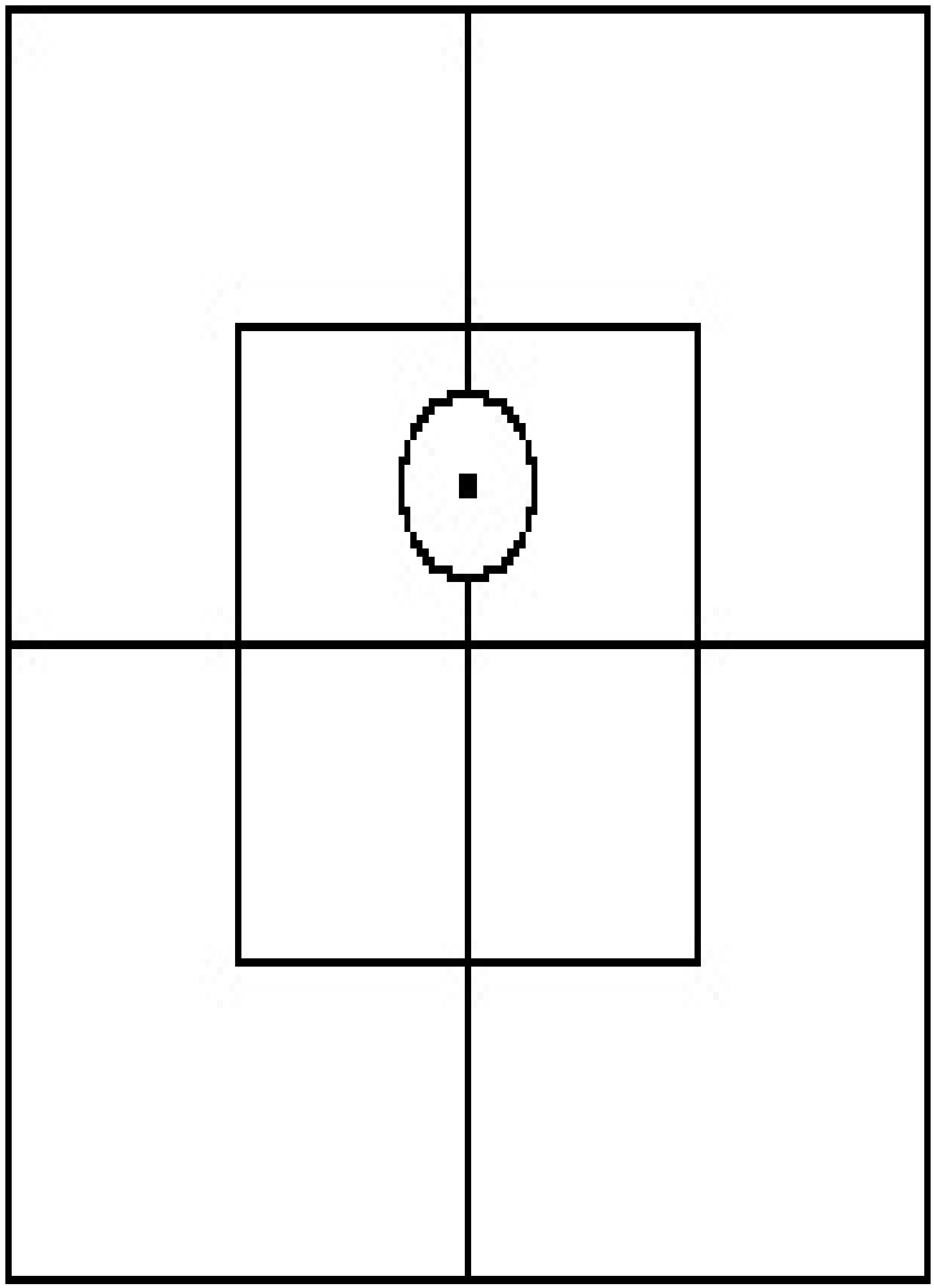
§ 1.

Representation of Propositions of Existence in terms of x and m, or of y and m.



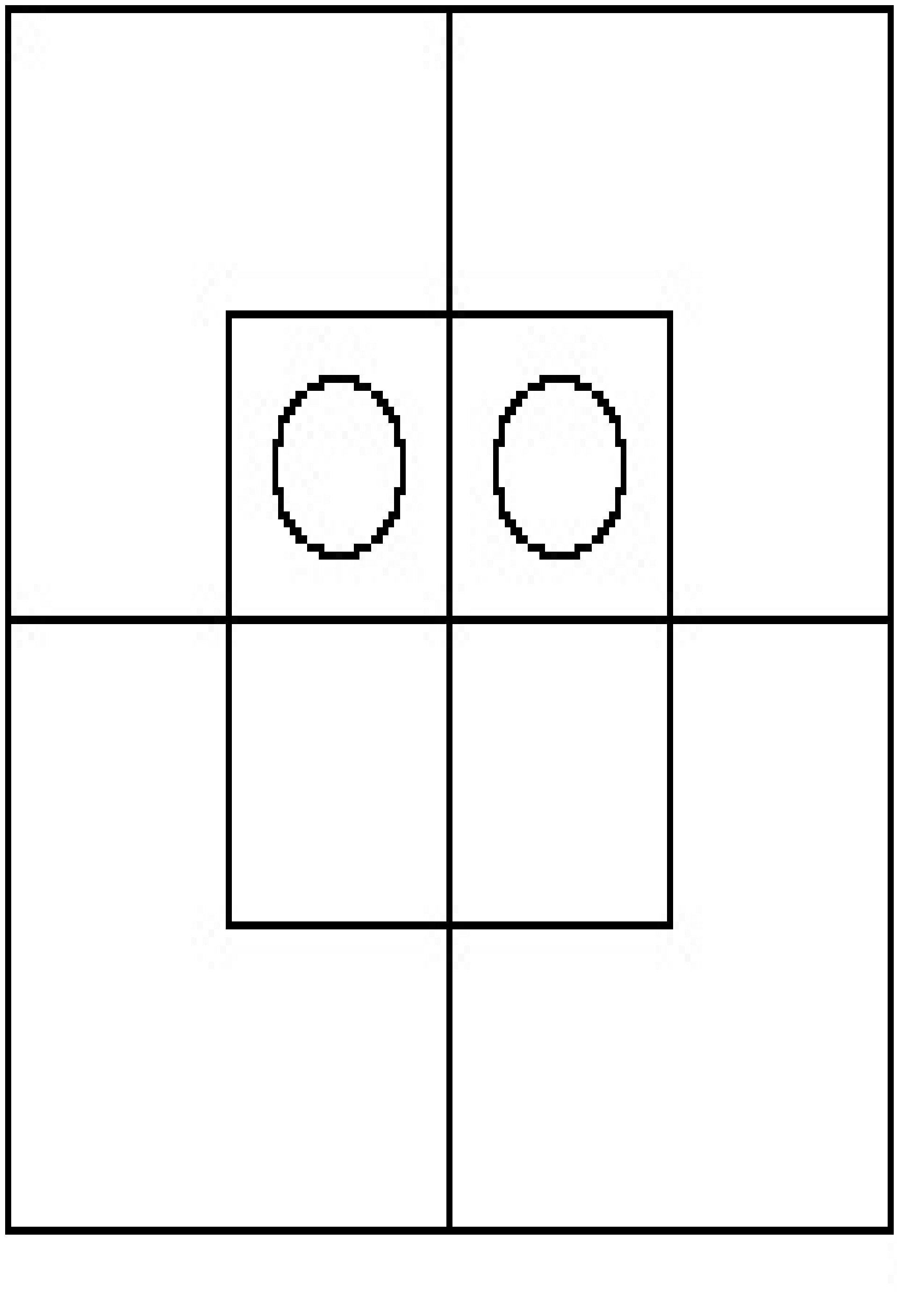
Let us take, first, the Proposition “Some xm exist”.

[Note that the full meaning of this Proposition is (as explained at p. 12) “Some existing Things are xm-Things”.]

This tells us that there is at least one Thing in the Inner portion of the North Half; that is, that this Compartment is occupied. And this we can evidently represent by placing a Red Counter on the partition which divides it.

[In the “books” example, this Proposition would mean “Some old bound books exist” (or “There are some old bound books”).]

Similarly we may represent the seven similar Propositions, “Some xm′ exist”, “Some x′m exist”, “Some x′m′ exist”, “Some ym exist”, “Some ym′ exist”, “Some y′m exist”, and “Some y′m′ exist”.



Let us take, next, the Proposition “No xm exist”.

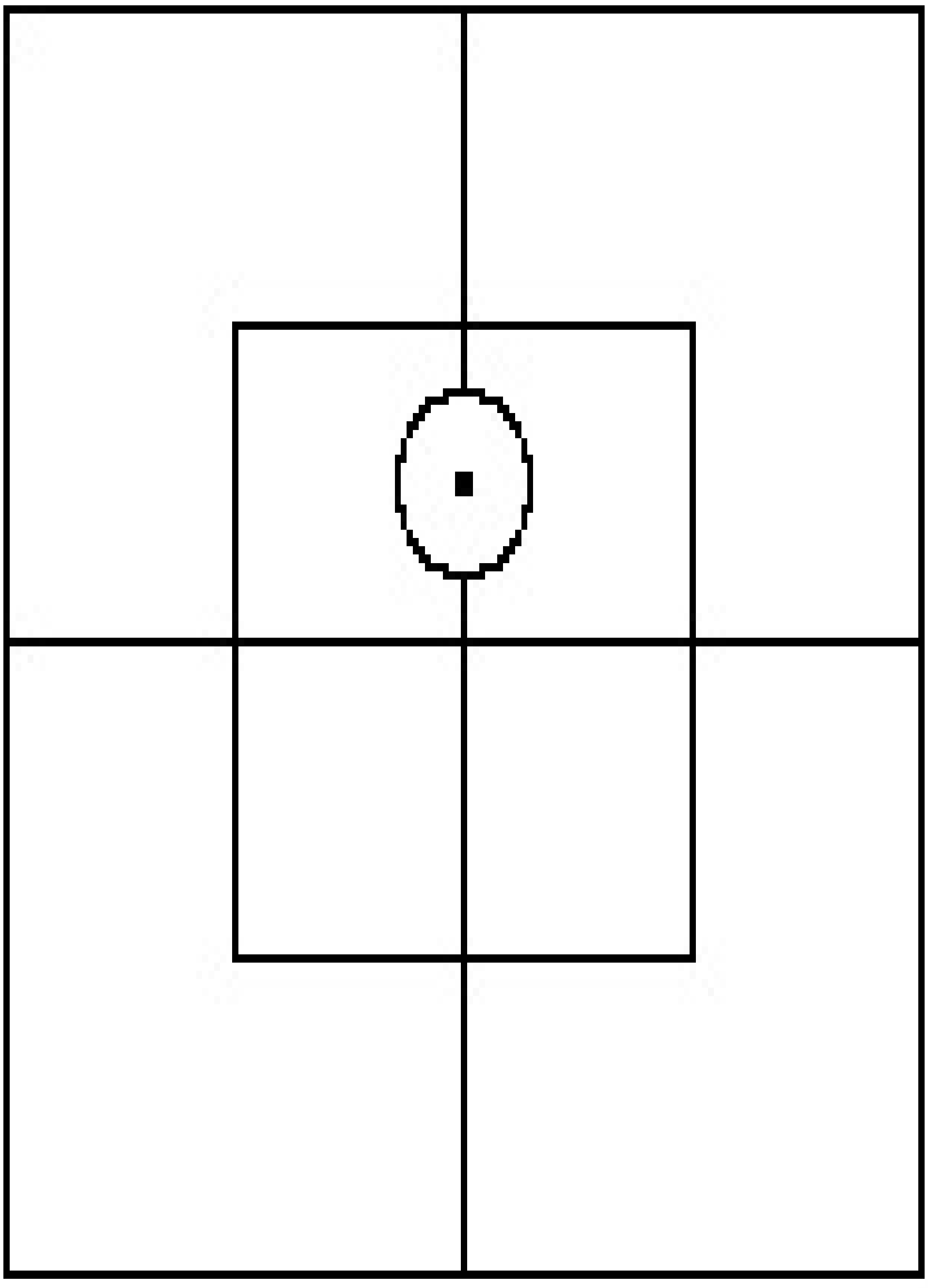
This tells us that there is nothing in the Inner portion of the North Half; that is, that this Compartment is empty. And this we can represent by placing two Grey Counters in it, one in each Cell.

Similarly we may represent the seven similar Propositions, in terms of x and m, or of y and m, viz. “No xm′ exist”, “No x′m exist”, &c.

These sixteen Propositions of Existence are the only ones that we shall have to represent on this Diagram.

§ 2.

Representation of Propositions of Relation in terms of x and m, or of y and m.

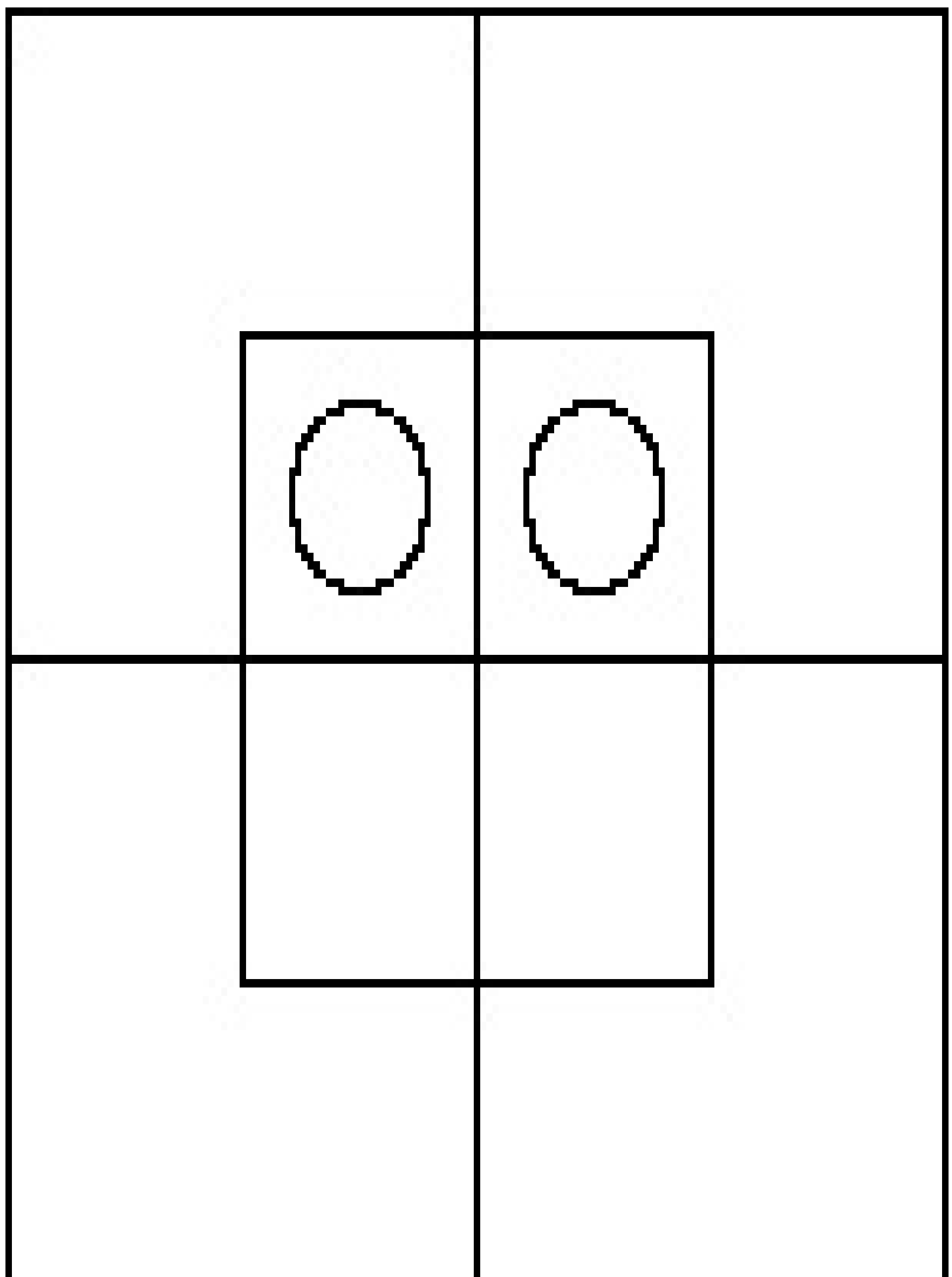


Let us take, first, the Pair of Converse Propositions

“Some x are m” = “Some m are x.”

We know that each of these is equivalent to the Proposition of Existence “Some xm exist”, which we already know how to represent.

Similarly for the seven similar Pairs, in terms of x and m, or of y and m.

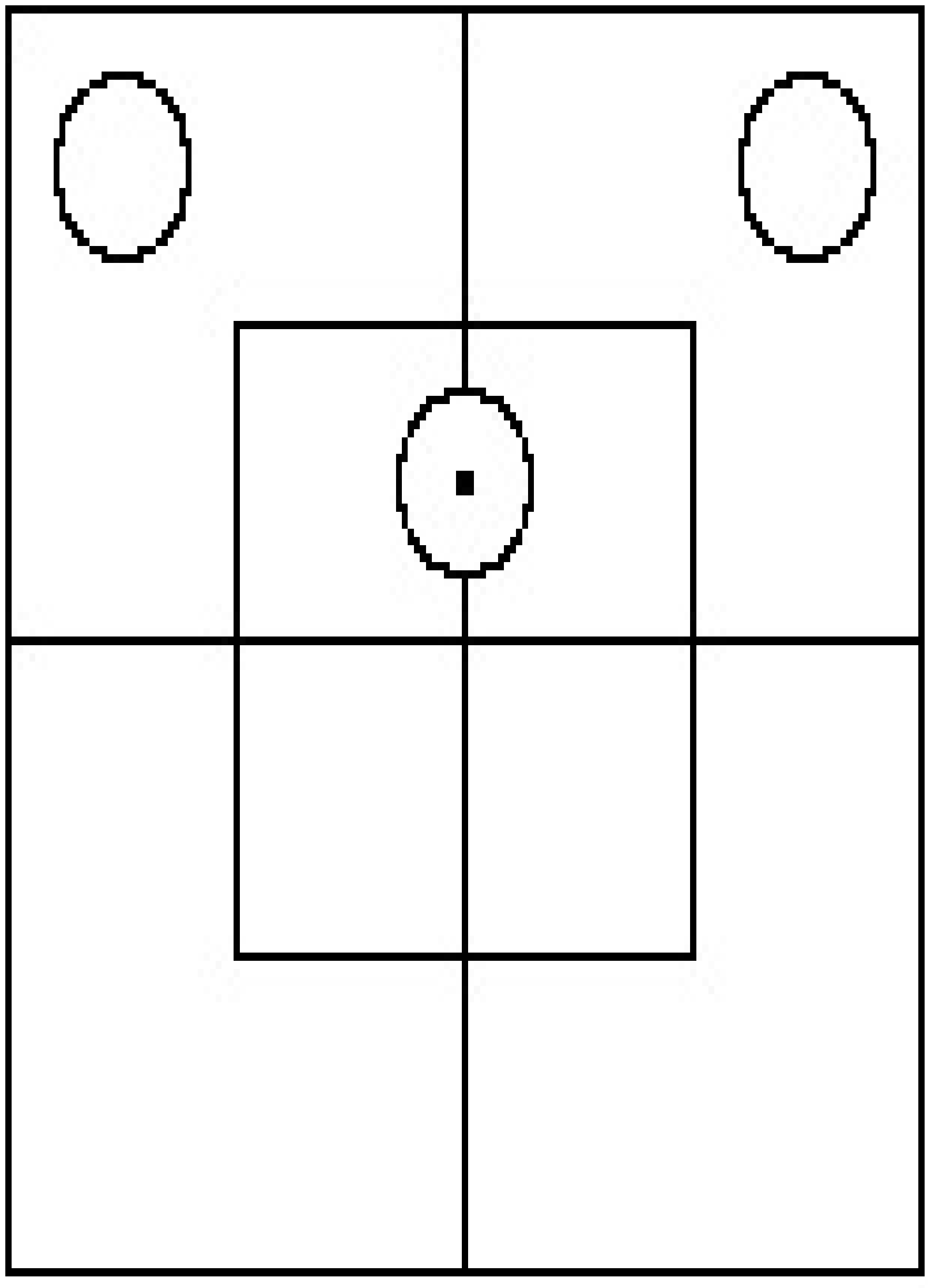


Let us take, next, the Pair of Converse Propositions

“No x are m” = “No m are x.”

We know that each of these is equivalent to the Proposition of Existence “No xm exist”, which we already know how to represent.

Similarly for the seven similar Pairs, in terms of x and m, or of y and m.



Let us take, next, the Proposition “All x are m.”

We know (see p. 18) that this is a Double Proposition, and equivalent to the two Propositions “Some x are m” and “No x are m′ ”, each of which we already know how to represent.

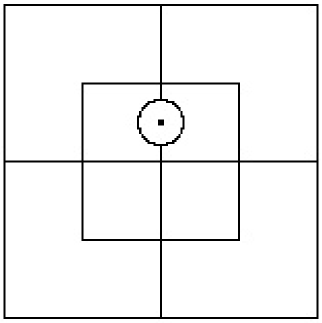
Similarly for the fifteen similar Propositions, in terms of x and m, or of y and m.

These thirty-two Propositions of Relation are the only ones that we shall have to represent on this Diagram.

The Reader should now get his genial friend to question him on the following four Tables.

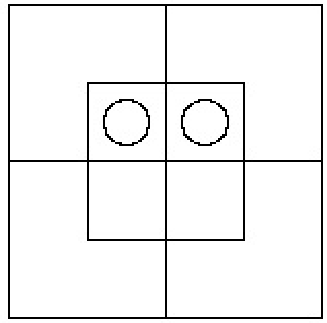
The Victim should have nothing before him but a blank Triliteral Diagram, a Red Counter, and 2 Grey ones, with which he is to represent the various Propositions named by the Inquisitor, e.g. “No y′ are m”, “Some xm′ exist”, &c., &c.

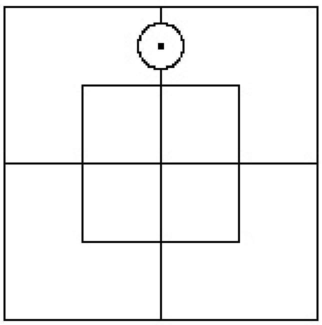
TABLE V.



Some xm exist
= Some x are m
= Some m are x

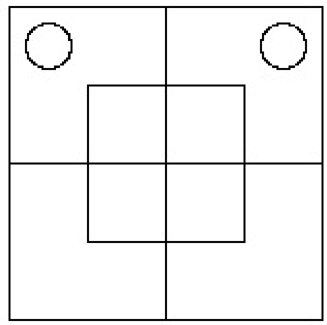
No xm exist
= No x are m
= No m are x

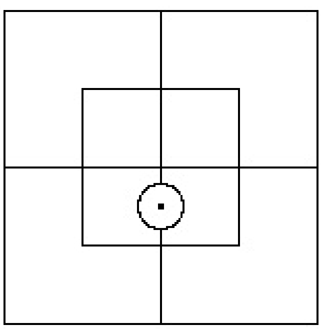




Some xm' exist
= Some x are m'
= Some m' are x

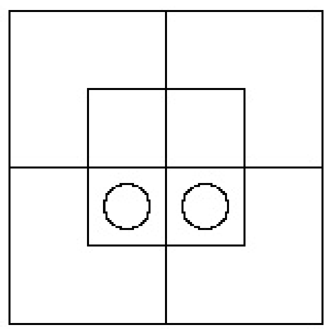
No xm' exist
= No x are m'
= No m' are x

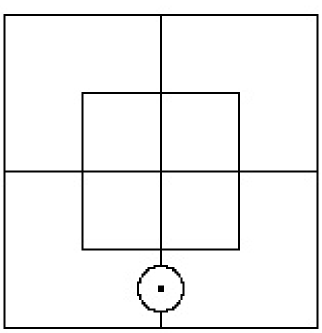




Some $x'm$ exist
= Some x' are m
= Some m are x'

No $x'm$ exist
= No x' are m
= No m are x'





Some $x'm'$ exist
= Some x' are m'
= Some m' are x'

No $x'm'$ exist
= No x' are m'
= No m' are x'

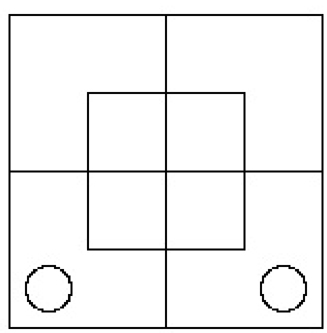
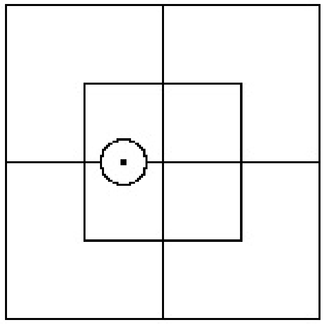
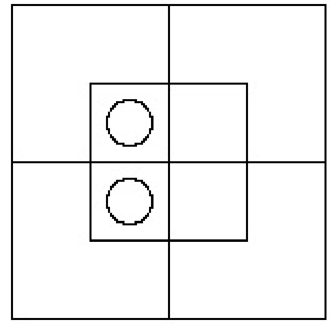


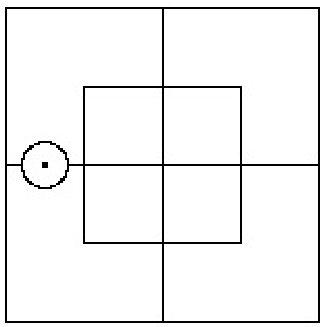
TABLE VI.



Some ym exist
= Some y are m
= Some m are y

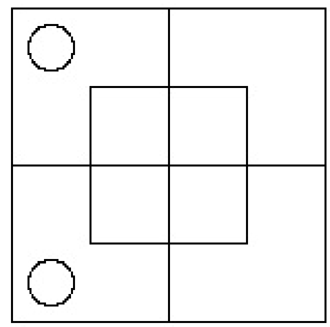
No ym exist
= No y are m
= No m are y

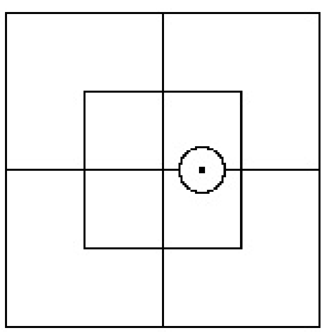




Some ym' exist
= Some y are m'
= Some m' are y

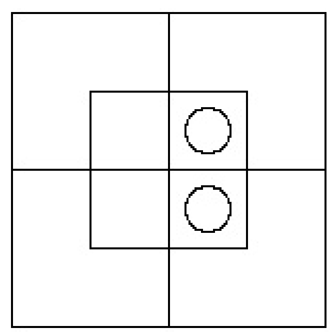
No ym' exist
= No y are m'
= No m' are y

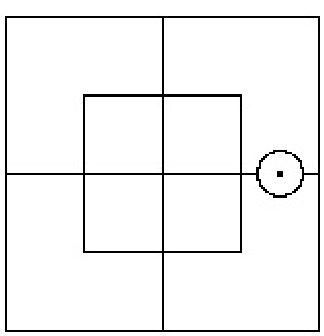




Some $y'm$ exist
= Some y' are m
= Some m are y'

No $y'm$ exist
= No y' are m
= No m are y'





Some $y'm'$ exist
= Some y' are m'
= Some m' are y'

No $y'm'$ exist
= No y' are m'
= No m' are y'

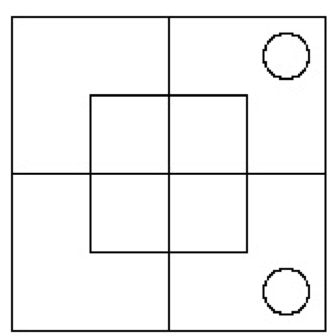
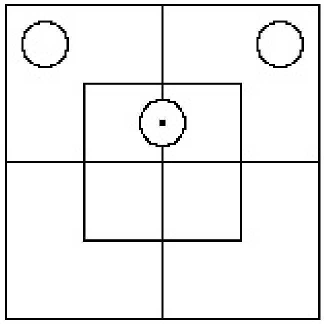
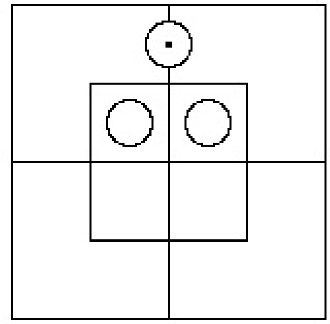


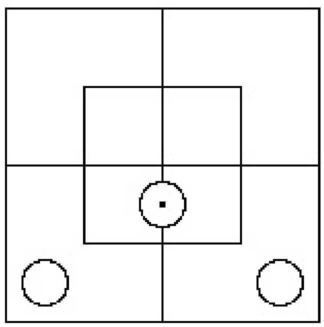
TABLE VII.



All x are m

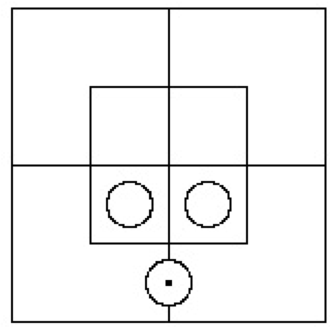
All x are m'

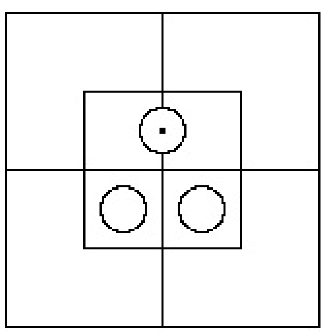




All x' are m

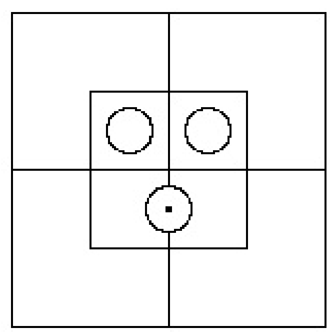
All x' are m'

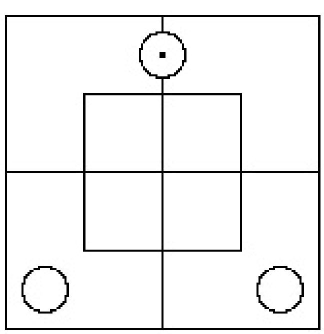




All m are x

All m are x'





All m' are x

All m' are x'

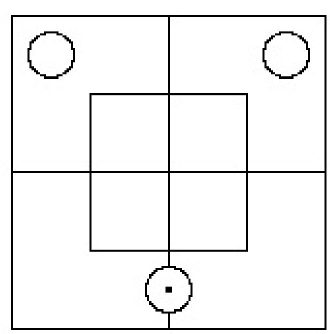
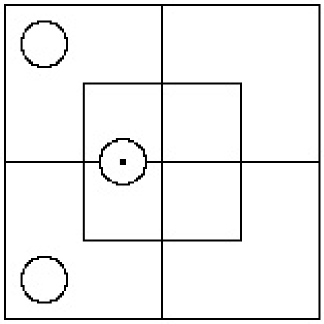
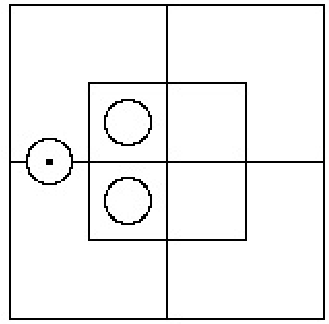


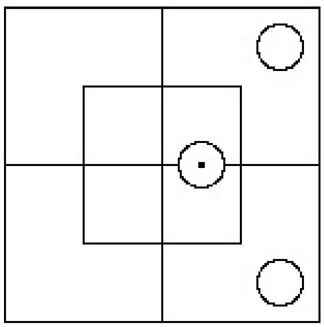
TABLE VIII.



All y are m

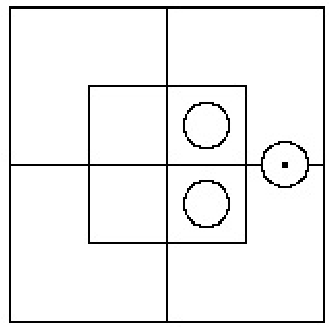
All y are m'

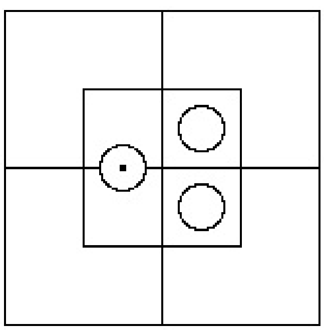




All y' are m

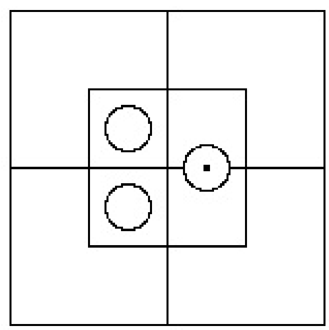
All y' are m'

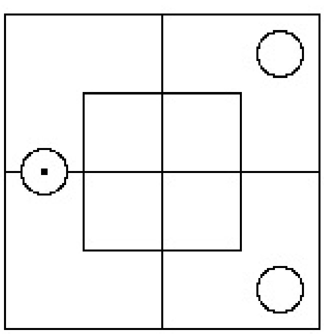




All m are y

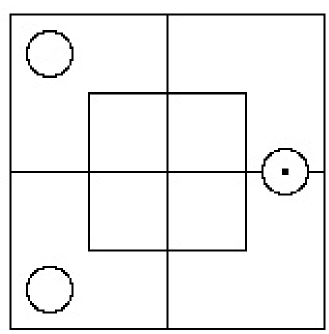
All m are y'





All m' are y

All m' are y'



CHAPTER III.

REPRESENTATION OF TWO PROPOSITIONS OF RELATION, ONE IN TERMS OF x AND m, AND THE OTHER IN TERMS OF y AND m, ON THE SAME DIAGRAM.

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The Reader had better now begin to draw little Diagrams for himself, and to mark them with the Digits “I” and “O”, instead of using the Board and Counters: he may put a “I” to represent a Red Counter (this may be interpreted to mean “There is at least one Thing here”), and a “O” to represent a Grey Counter (this may be interpreted to mean “There is nothing here”).

The Pair of Propositions, that we shall have to represent, will always be, one in terms of x and m, and the other in terms of y and m.

When we have to represent a Proposition beginning with “All”, we break it up into the two Propositions to which it is equivalent.

When we have to represent, on the same Diagram, Propositions, of which some begin with “Some” and others with “No”, we represent the negative ones first. This will sometimes save us from having to put a “I” “on a fence” and afterwards having to shift it into a Cell.

[Let us work a few examples.

(1)

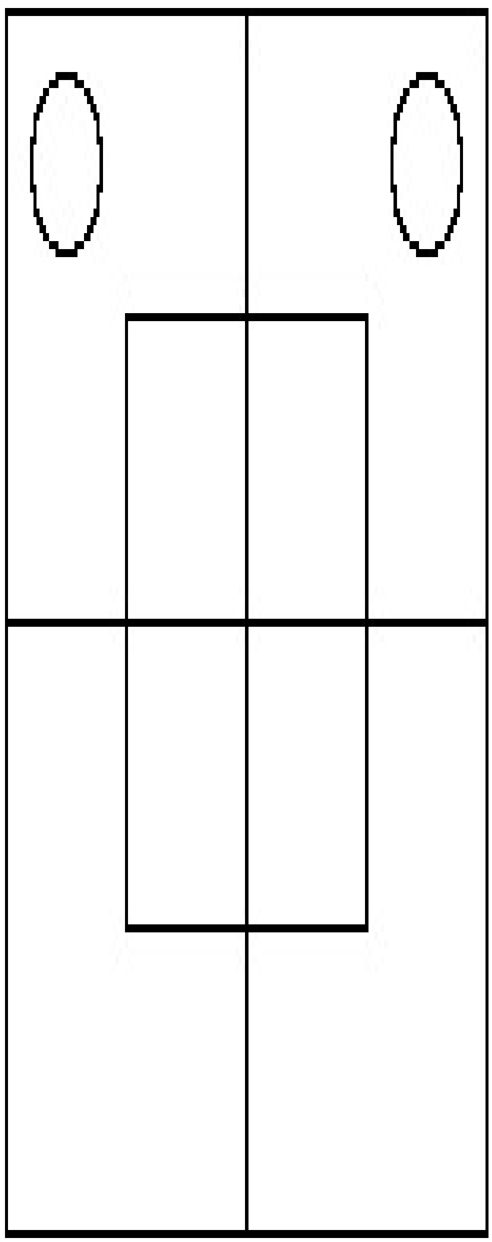
“No x are m′;

No y′ are m”.

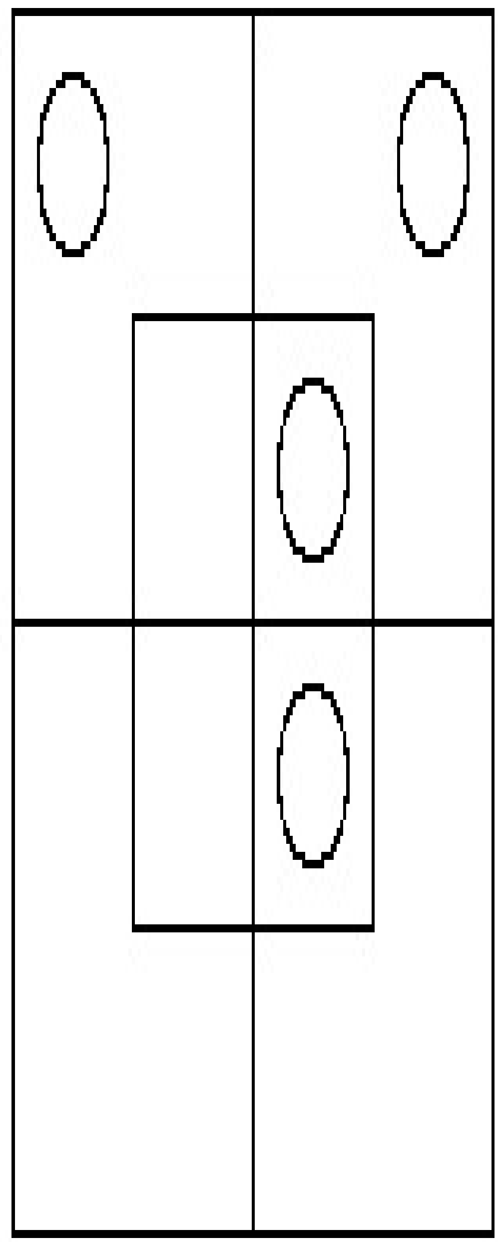
Let us first represent “No x are m′”. This gives us Diagram a.

Then, representing “No y′ are m” on the same Diagram, we get Diagram b.

a



b



(2)

“Some m are x;

No m are y”.

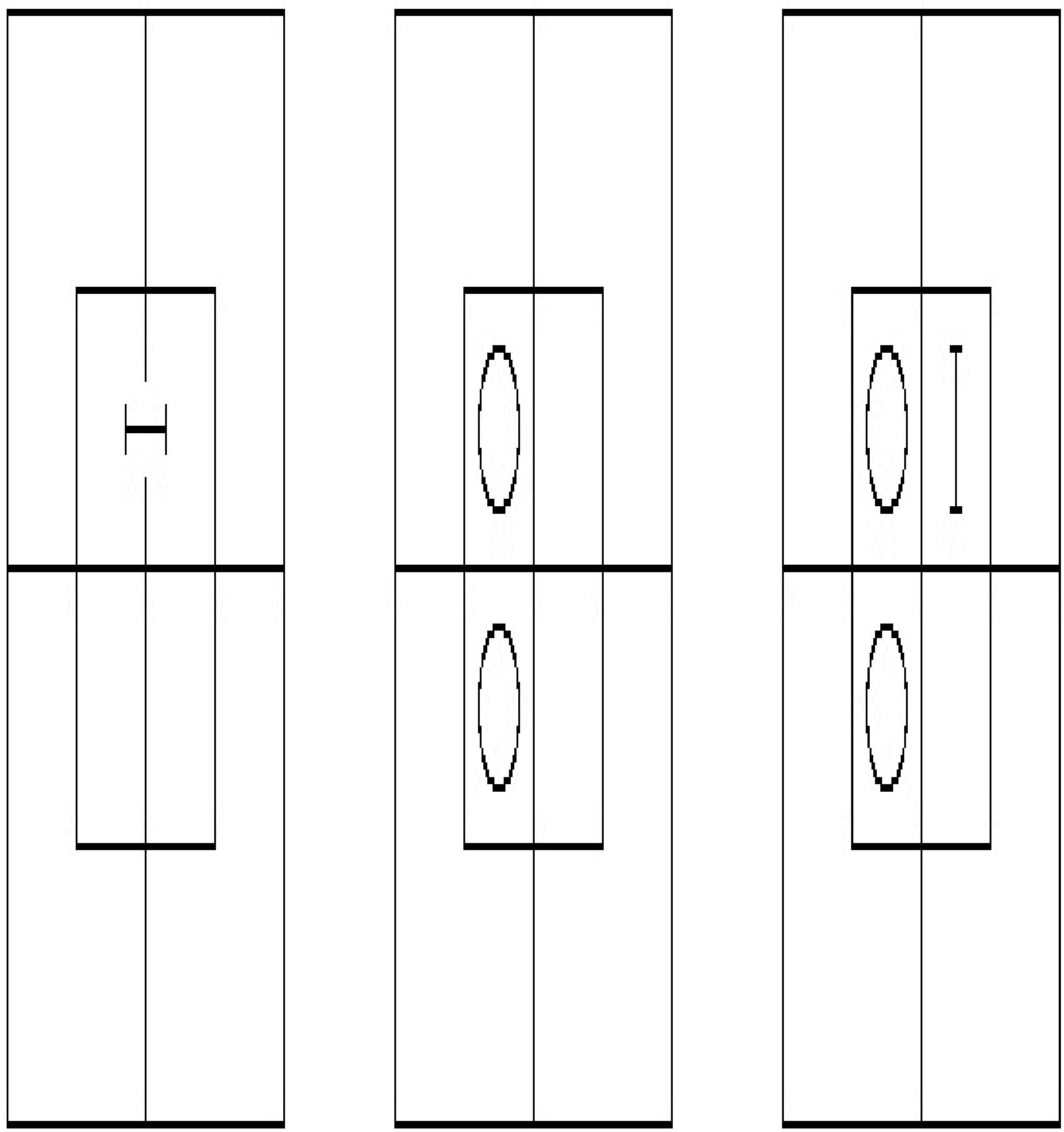
If, neglecting the Rule, we were begin with “Some m are x”, we should get Diagram a.

And if we were then to take “No m are y”, which tells us that the Inner N.W. Cell is empty, we should be obliged to take the “I” off the fence (as it no longer has the choice of two Cells), and to put it into the Inner N.E. Cell, as in Diagram c.

This trouble may be saved by beginning with “No m are y”, as in Diagram b.

And now, when we take “Some m are x”, there is no fence to sit on! The “I” has to go, at once, into the N.E. Cell, as in Diagram c.

a b c



(3)

“No x′ are m′;

All m are y”.

Here we begin by breaking up the Second into the two Propositions to which it is equivalent. Thus we have three Propositions to represent, viz.—

(1) “No x′ are m′;

(2) Some m are y;

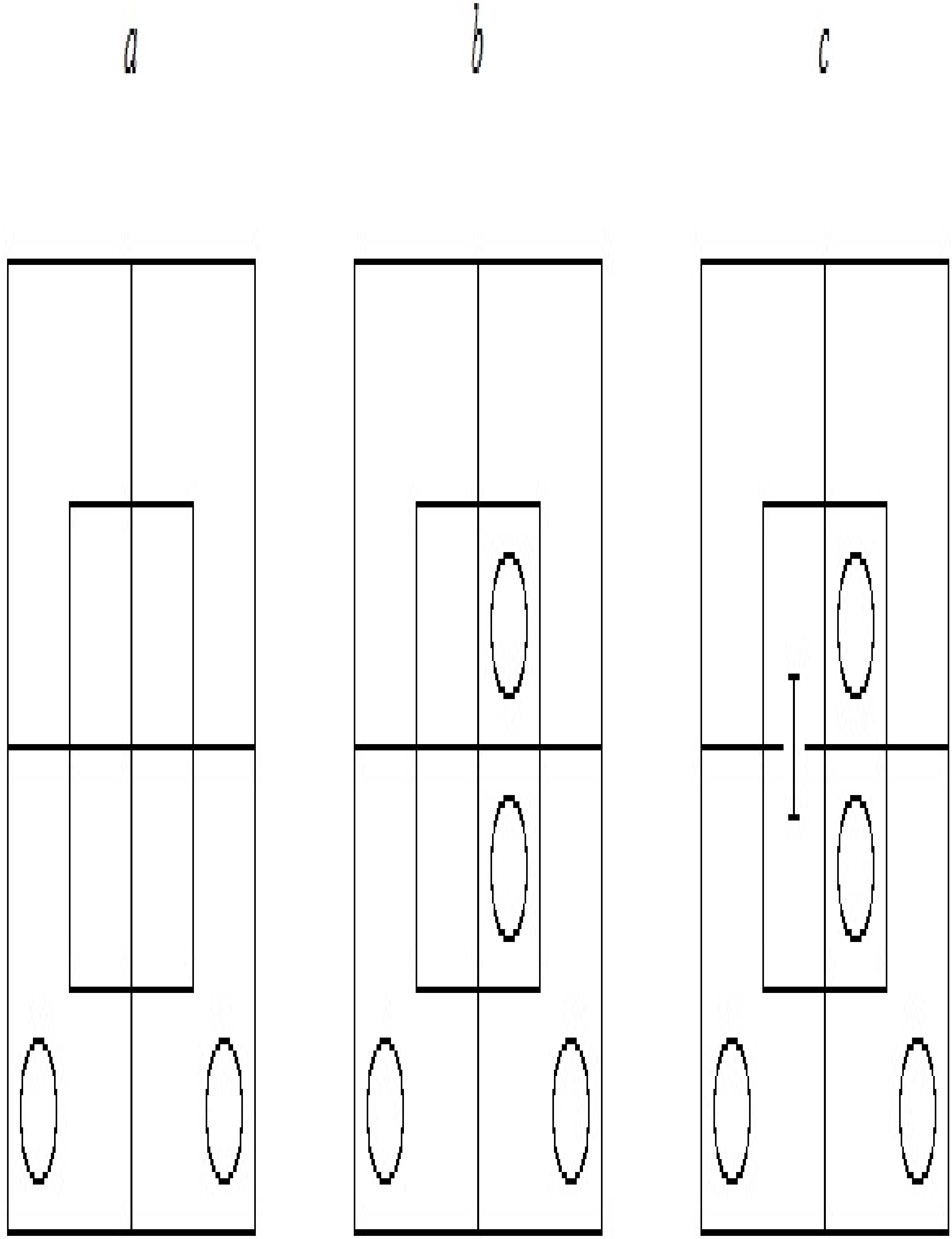
(3) No m are y′”.

These we will take in the order 1, 3, 2.

First we take No. (1), viz. “No x′ are m′”. This gives us Diagram a.

Adding to this, No. (3), viz. “No m are y′”, we get Diagram b.

This time the “I”, representing No. (2), viz. “Some m are y,” has to sit on the fence, as there is no “O” to order it off! This gives us Diagram c.


a
b
c

(4)

“All m are x;

All y are m”.

Here we break up both Propositions, and thus get four to represent, viz.—

(1) “Some m are x;

(2) No m are x′;

(3) Some y are m;

(4) No y are m′”.

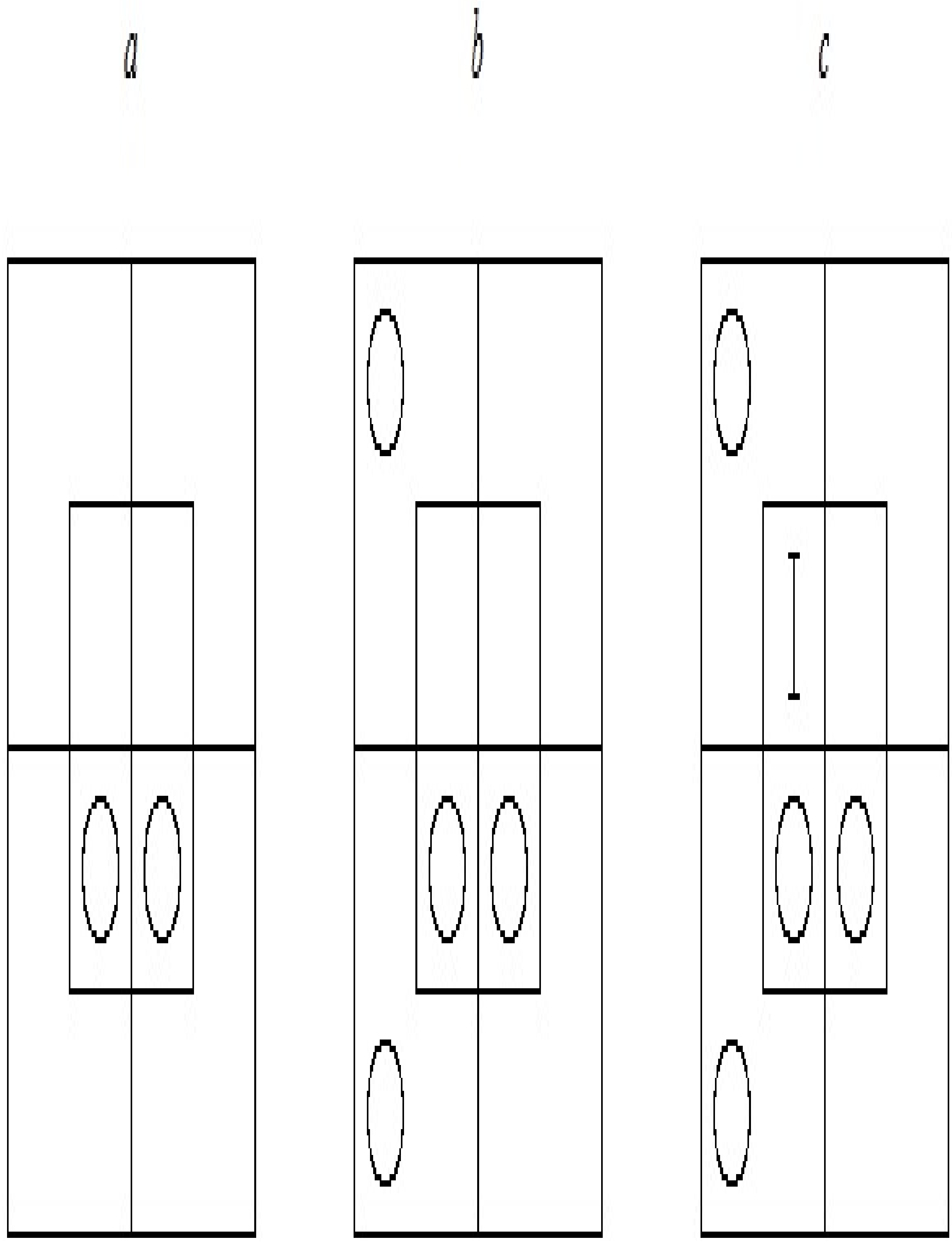
These we will take in the order 2, 4, 1, 3.

First we take No. (2), viz. “No m are x′”. This gives us Diagram a.

To this we add No. (4), viz. “No y are m′”, and thus get Diagram b.

If we were to add to this No. (1), viz. “Some m are x”, we should have to put the “I” on a fence: so let us try No. (3) instead, viz. “Some y are m”. This gives us Diagram c.

And now there is no need to trouble about No. (1), as it would not add anything to our information to put a “I” on the fence. The Diagram already tells us that “Some m are x”.]


a
b
c

[Work Examples § 1, 9–12 (p. 97); § 2, 1–20 (p. 98).]

CHAPTER IV.

INTERPRETATION, IN TERMS OF x AND y, OF TRILITERAL DIAGRAM, WHEN MARKED WITH COUNTERS OR DIGITS.

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The problem before us is, given a marked Triliteral Diagram, to ascertain what Propositions of Relation, in terms of x and y, are represented on it.

The best plan, for a beginner, is to draw a Biliteral Diagram alongside of it, and to transfer, from the one to the other, all the information he can. He can then read off, from the Biliteral Diagram, the required Propositions. After a little practice, he will be able to dispense with the Biliteral Diagram, and to read off the result from the Triliteral Diagram itself.

To transfer the information, observe the following Rules:—

(1) Examine the N.W. Quarter of the Triliteral Diagram.

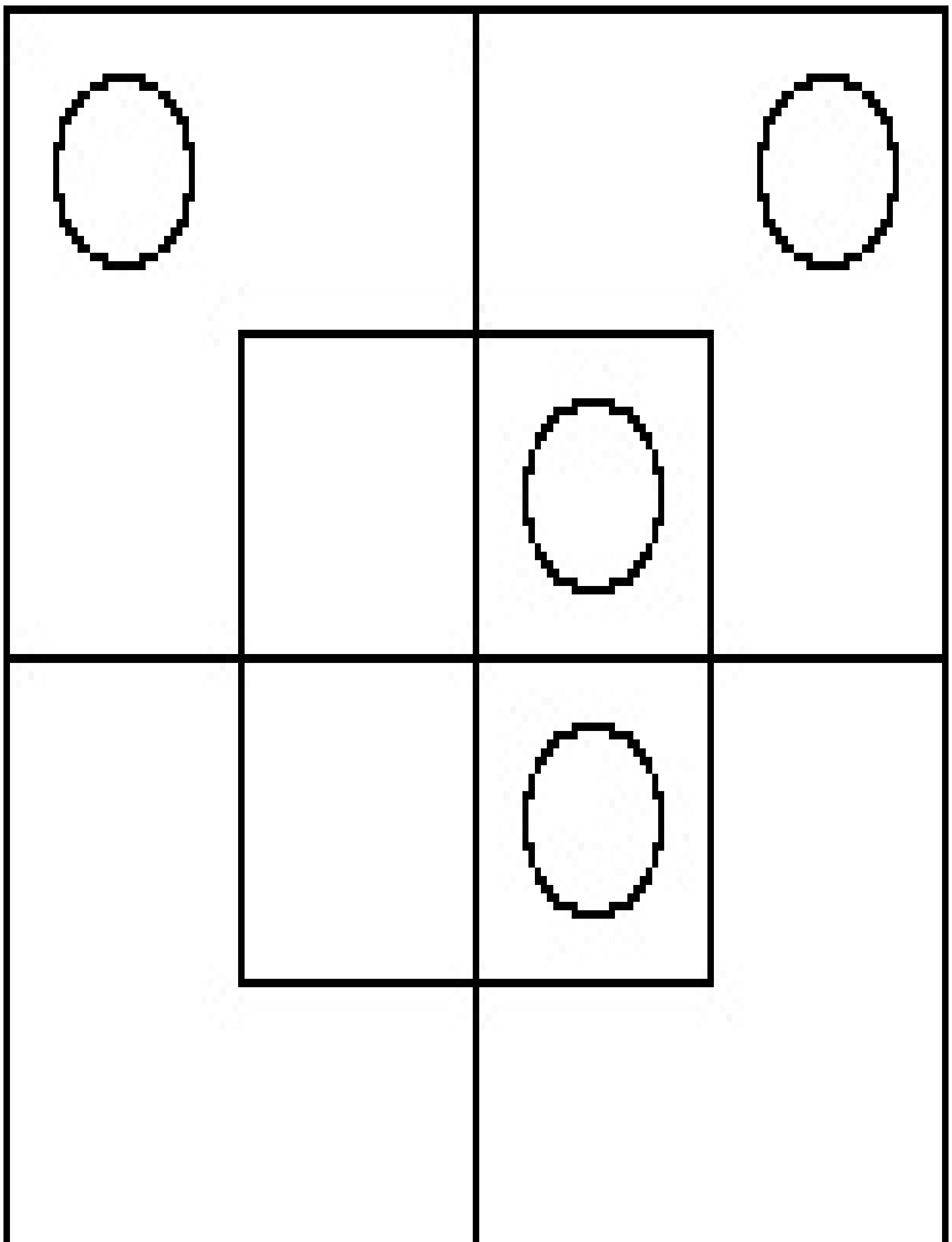
(2) If it contains a “I”, in either Cell, it is certainly occupied, and you may mark the N.W. Quarter of the Biliteral Diagram with a “I”.

(3) If it contains two “O”s, one in each Cell, it is certainly empty, and you may mark the N.W. Quarter of the Biliteral Diagram with a “O”.

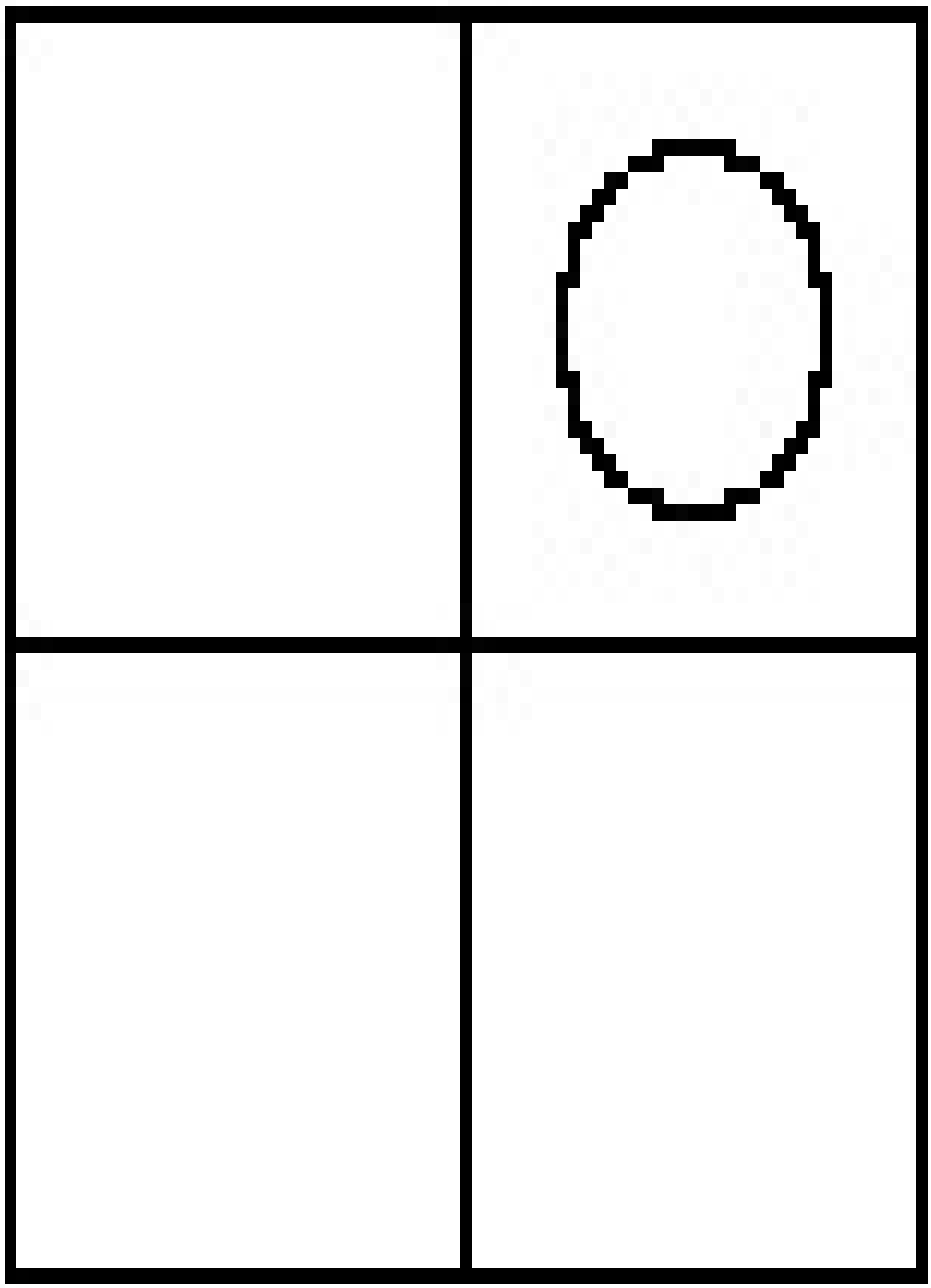
(4) Deal in the same way with the N.E., the S.W., and the S.E. Quarter.

[Let us take, as examples, the results of the four Examples worked in the previous Chapters.

(1)



In the N.W. Quarter, only one of the two Cells is marked as empty: so we do not know whether the N.W. Quarter of the Biliteral Diagram is occupied or empty: so we cannot mark it.



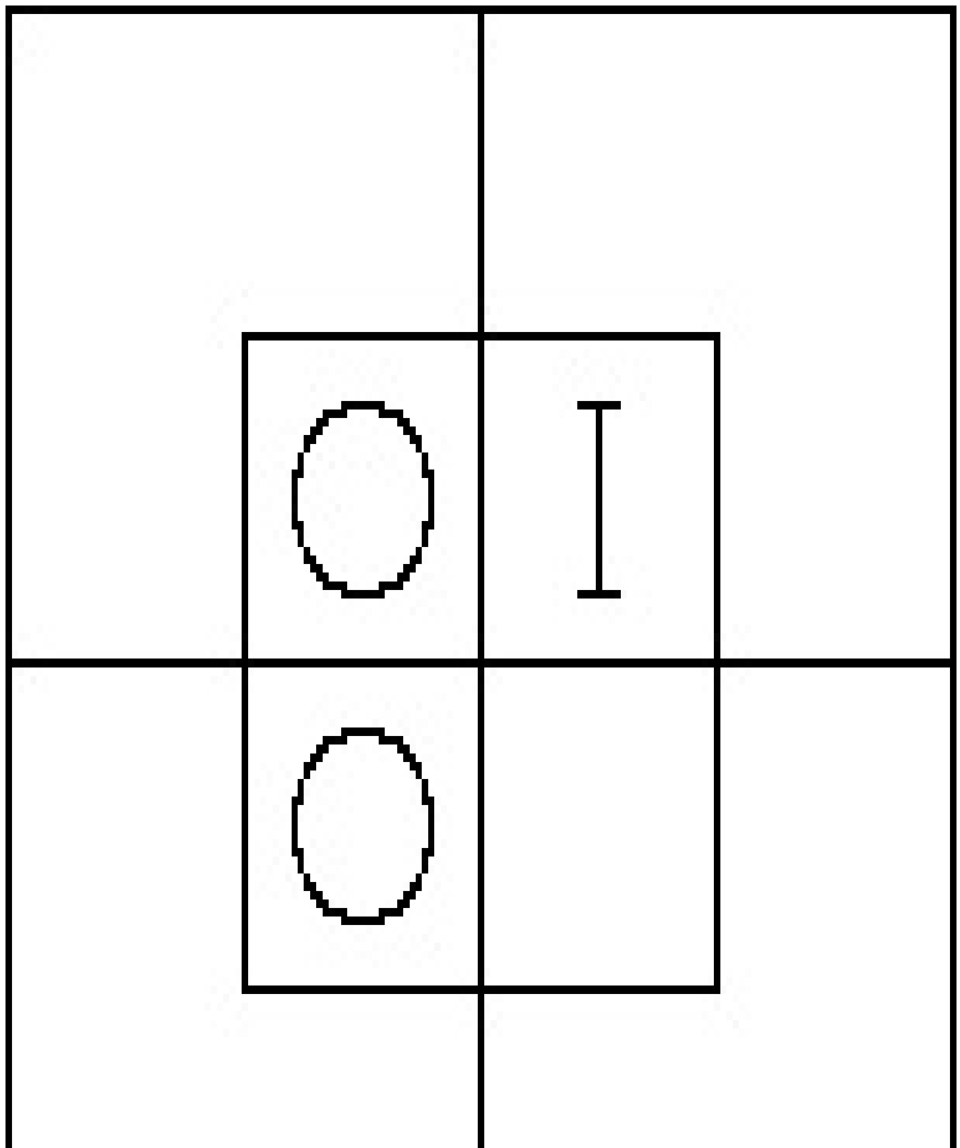
In the N.E. Quarter, we find two “O”s: so this Quarter is certainly empty; and we mark it so on the Biliteral Diagram.

In the S.W. Quarter, we have no information at all.

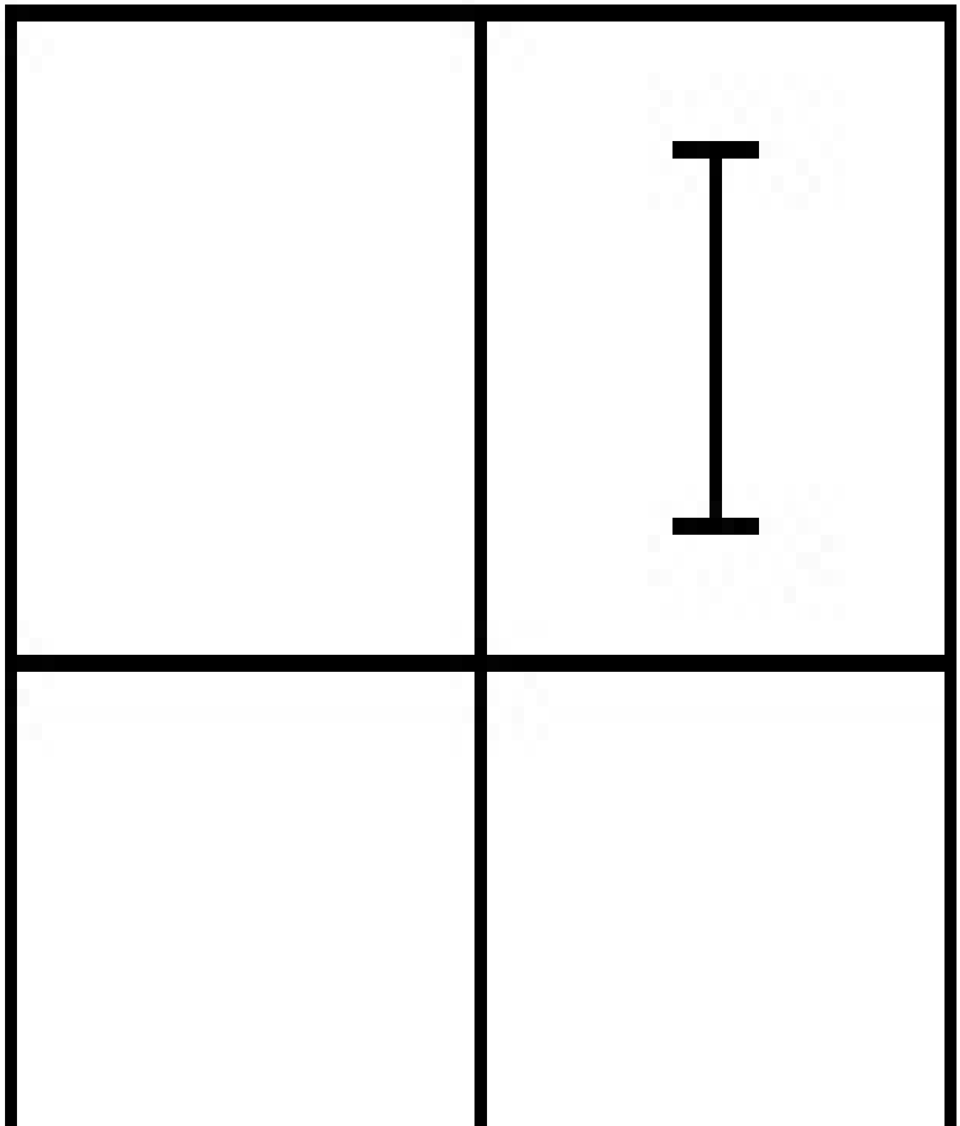
In the S.E. Quarter, we have not enough to use.

We may read off the result as “No x are y'”, or “No y' are x,” whichever we prefer.

(2)



In the N.W. Quarter, we have not enough information to use.



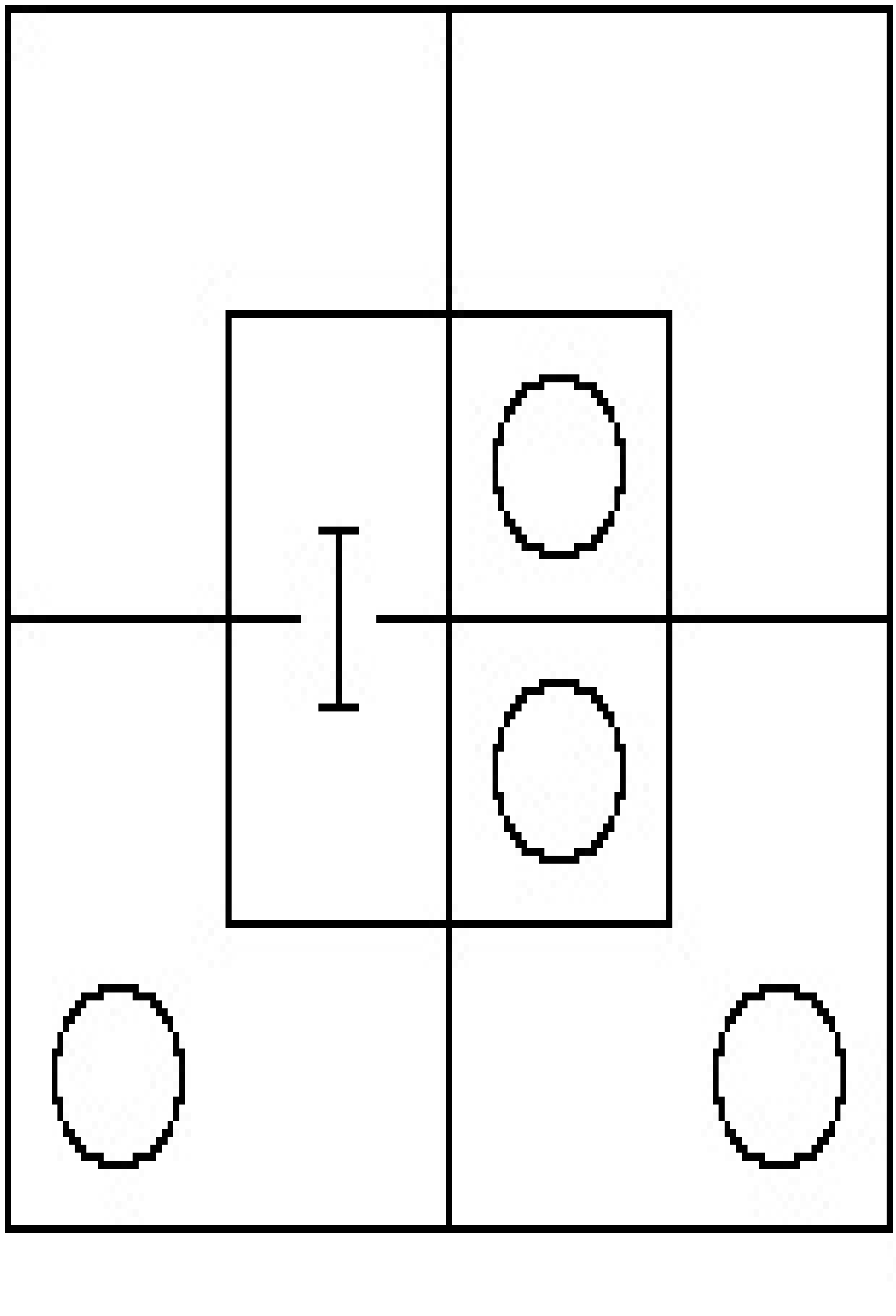
In the N.E. Quarter, we find a “I”. This shows us that it is occupied: so we may mark the N.E. Quarter on the Biliteral Diagram with a “I”.

In the S.W. Quarter, we have not enough information to use.

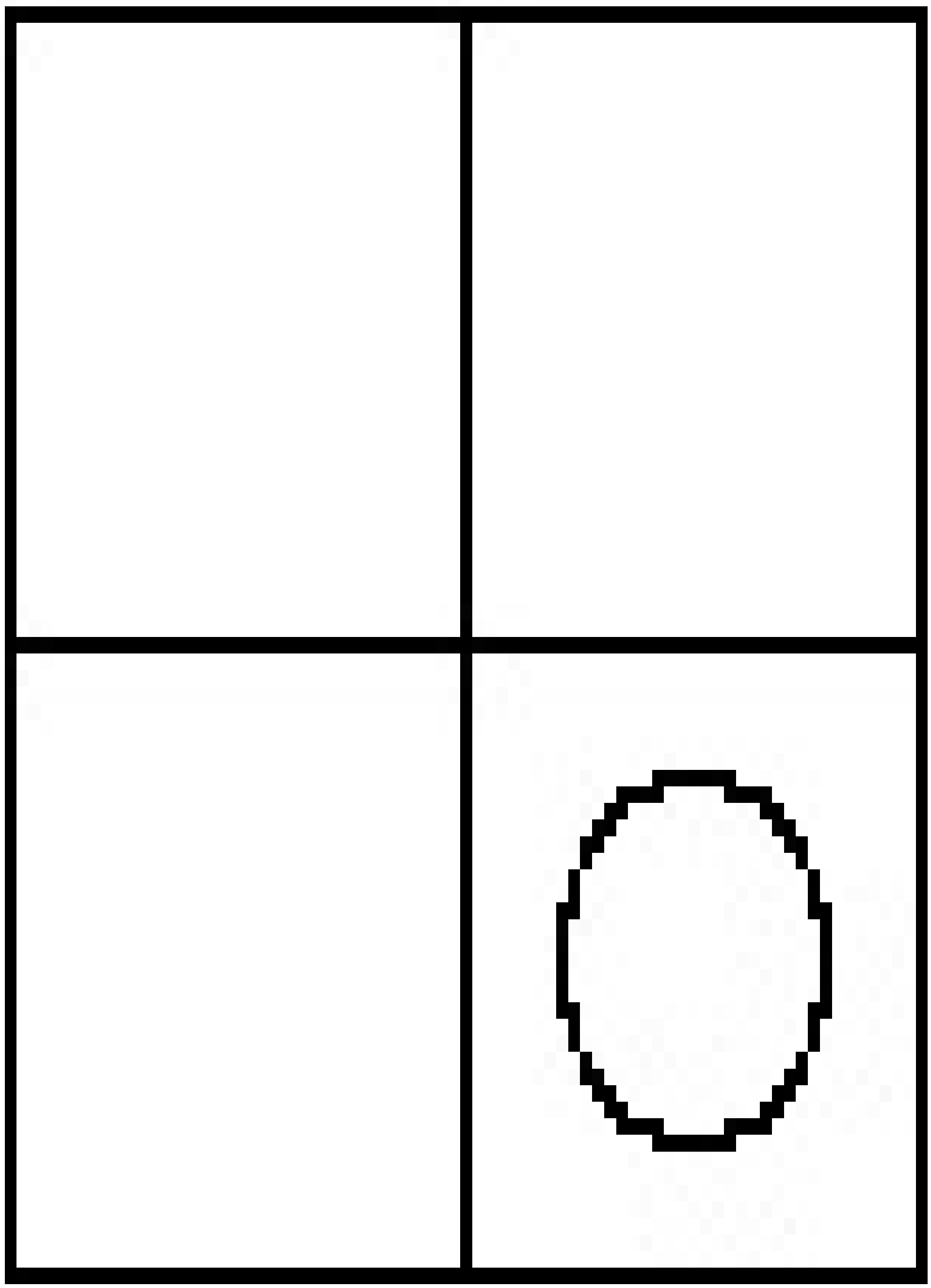
In the S.E. Quarter, we have none at all.

We may read off the result as “Some x are y′”, or “Some y′ are x”, whichever we prefer.

(3)



In the N.W. Quarter, we have no information. (The “I”, sitting on the fence, is of no use to us until we know on which side he means to jump down!)



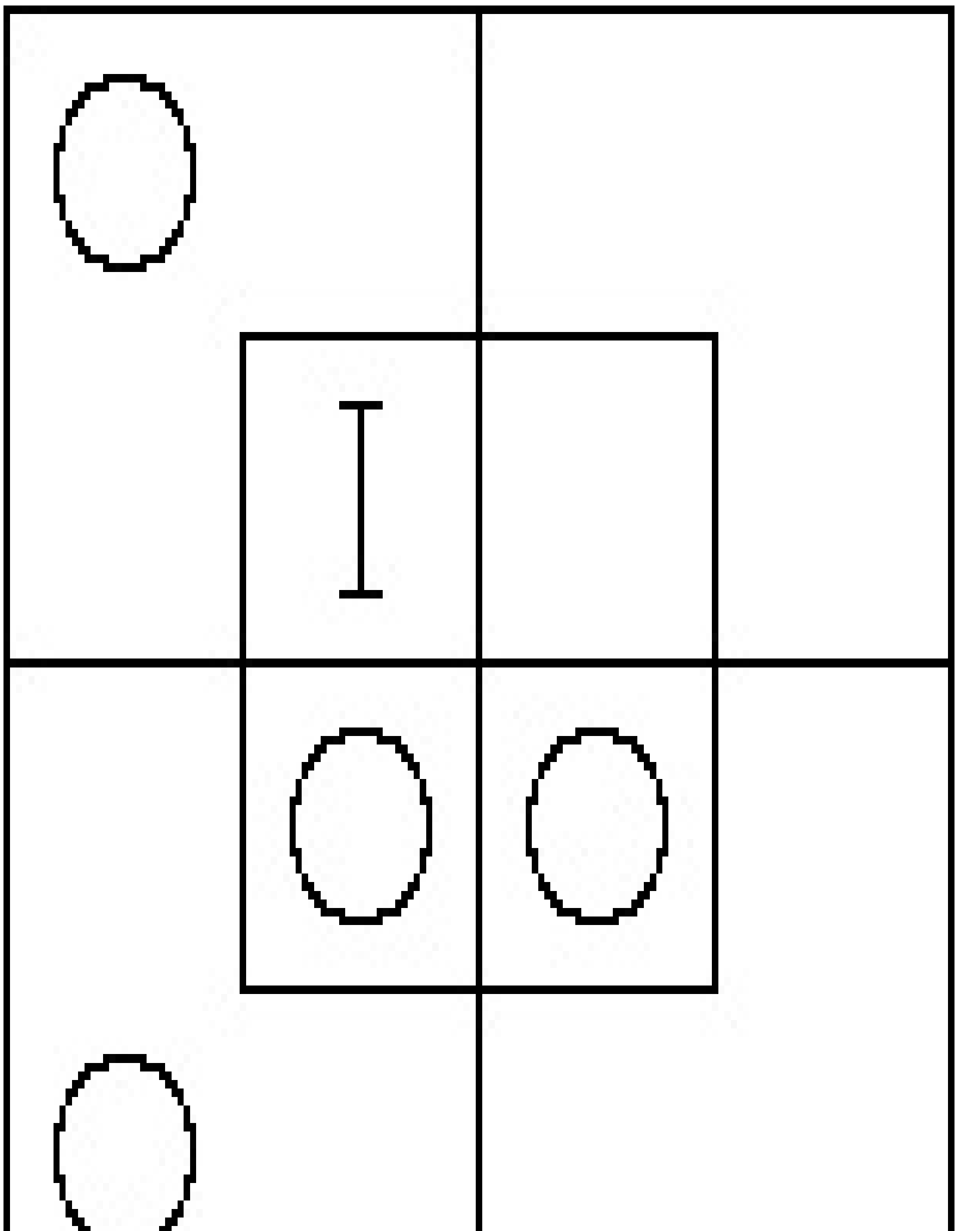
In the N.E. Quarter, we have not enough information to use.

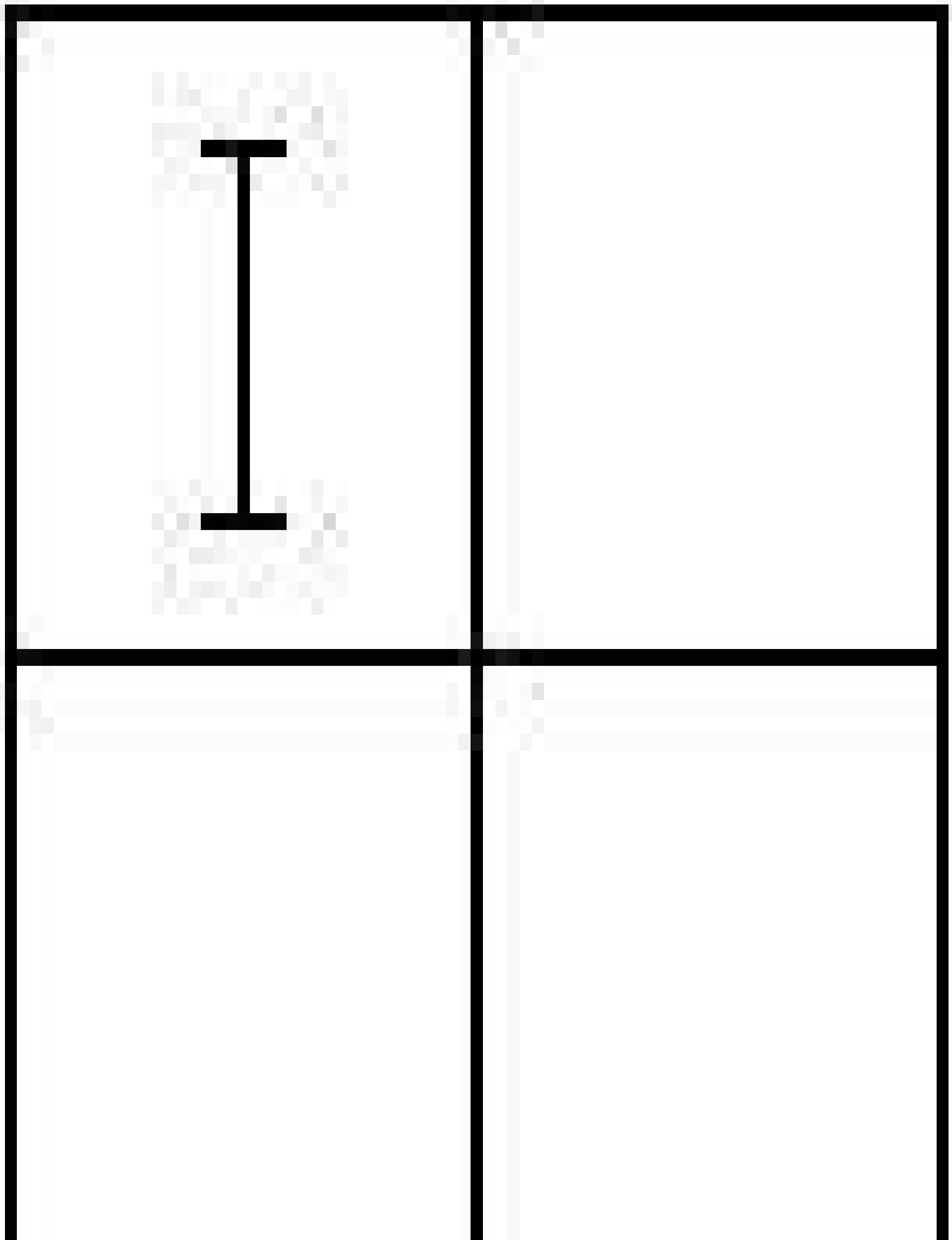
Neither have we in the S.W. Quarter.

The S.E. Quarter is the only one that yields enough information to use. It is certainly empty: so we mark it as such on the Biliteral Diagram.

We may read off the results as “No x′ are y′”, or “No y′ are x′”, whichever we prefer.

(4)




I

The N.W. Quarter is occupied, in spite of the “O” in the Outer Cell. So we mark it with a “I” on the Biliteral Diagram.

The N.E. Quarter yields no information.

I	
O	

The S.W. Quarter is certainly empty. So we mark it as such on the Biliteral Diagram.

The S.E. Quarter does not yield enough information to use.

We read off the result as “All y are x.”]

[Review Tables V, VI (pp. 46, 47). Work Examples § 1, 13–16 (p. 97); § 2, 21–32 (p. 98); § 3, 1–20 (p. 99).]

BOOK V.

SYLLOGISMS.

CHAPTER I.

INTRODUCTORY

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When a Trio of Biliteral Propositions of Relation is such that

(1) all their six Terms are Species of the same Genus,

(2) every two of them contain between them a Pair of codivisional Classes,

(3) the three Propositions are so related that, if the first two were true, the third would be true,

the Trio is called a ‘Syllogism’; the Genus, of which each of the six Terms is a Species, is called its ‘Universe of Discourse’, or, more briefly, its ‘Univ.’; the first two Propositions are called its ‘Premisses’, and the third its ‘Conclusion’; also the Pair of codivisional Terms in the Premisses are called its ‘Eliminands’, and the other two its ‘Retinends’.

The Conclusion of a Syllogism is said to be ‘consequent’ from its Premisses: hence it is usual to prefix to it the word “Therefore” (or the Symbol “∴”).

[Note that the ‘Eliminands’ are so called because they are eliminated, and do not appear in the Conclusion; and that the ‘Retinends’ are so called because they are retained, and do appear in the Conclusion.

Note also that the question, whether the Conclusion is or is not consequent from the Premisses, is not affected by the actual truth or falsity of any of the Trio, but depends entirely on their relationship to each other.

As a specimen-Syllogism, let us take the Trio

“No x-Things are m-Things;

No y-Things are m′-Things.

No x-Things are y-Things.”

which we may write, as explained at p. 26, thus:—

“No x are m;

No y are m′.

No x are y”.

Here the first and second contain the Pair of codivisional Classes m and m′; the first and third contain the Pair x and x; and the second and third contain the Pair y and y.

Also the three Propositions are (as we shall see hereafter) so related that, if the first two were true, the third would also be true.

Hence the Trio is a Syllogism; the two Propositions, “No x are m” and “No y are m′”, are its Premisses; the Proposition “No x are y” is its Conclusion; the Terms m and m′ are its Eliminands; and the Terms x and y are its Retinends.

Hence we may write it thus:—

“No x are m;

No y are m′.

∴ No x are y”.

As a second specimen, let us take the Trio

“All cats understand French;

Some chickens are cats.

Some chickens understand French”.

These, put into normal form, are

“All cats are creatures understanding French;

Some chickens are cats.

Some chickens are creatures understanding French”.

Here all the six Terms are Species of the Genus “creatures.”

Also the first and second Propositions contain the Pair of codivisional Classes “cats” and “cats”; the first and third contain the Pair “creatures understanding French” and “creatures understanding French”; and the second and third contain the Pair “chickens” and “chickens”.

Also the three Propositions are (as we shall see at p. 64) so related that, if the first two were true, the third would be true. (The first two are, as it happens, not strictly true in our planet. But there is nothing to hinder them from being true in some other planet, say Mars or Jupiter—in which case the third would also be true in that planet, and its inhabitants would probably engage chickens as nursery-governesses. They would thus secure a singular contingent privilege, unknown in England, namely, that they would be able, at any time when provisions ran short, to utilise the nursery-governess for the nursery-dinner!)

Hence the Trio is a Syllogism; the Genus "creatures" is its 'Univ.'; the two Propositions, "All cats understand French" and "Some chickens are cats", are its Premisses, the Proposition "Some chickens understand French" is its Conclusion; the Terms "cats" and "cats" are its Eliminands; and the Terms, "creatures understanding French" and "chickens", are its Retinends.

Hence we may write it thus:—

"All cats understand French;

Some chickens are cats;

∴ Some chickens understand French".]

CHAPTER II.

PROBLEMS IN SYLLOGISMS.

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§ 1.

Introductory.

When the Terms of a Proposition are represented by words, it is said to be ‘concrete’; when by letters, ‘abstract.’

To translate a Proposition from concrete into abstract form, we fix on a Univ., and regard each Term as a Species of it, and we choose a letter to represent its Differentia.

[For example, suppose we wish to translate “Some soldiers are brave” into abstract form. We may take “men” as Univ., and regard “soldiers” and “brave men” as Species of the Genus “men”; and we may choose x to represent the peculiar Attribute (say “military”) of “soldiers,” and y to represent “brave.” Then the Proposition may be written “Some military men are brave men”; i.e. “Some x-men are y-men”; i.e. (omitting “men,” as explained at p. 26) “Some x are y.”

In practice, we should merely say “Let Univ. be “men”, x = soldiers, y = brave”,

and at once translate “Some soldiers are brave” into “Some x are y.”]

The Problems we shall have to solve are of two kinds, viz.

(1) “Given a Pair of Propositions of Relation, which contain between them a pair of codivisional Classes, and which are proposed as Premisses: to ascertain what Conclusion, if any, is consequent from them.”

(2) “Given a Trio of Propositions of Relation, of which every two contain a pair of codivisional Classes, and which are proposed as a Syllogism: to ascertain whether the proposed Conclusion is consequent from the proposed Premisses, and, if so, whether it is complete.”

These Problems we will discuss separately.

§ 2.

Given a Pair of Propositions of Relation, which contain between them a pair of codivisional Classes, and which are proposed as Premisses: to ascertain what Conclusion, if any, is consequent from them.

The Rules, for doing this, are as follows:—

(1) Determine the ‘Universe of Discourse’.

(2) Construct a Dictionary, making m and m (or m and m') represent the pair of codivisional Classes, and x (or x') and y (or y') the other two.

(3) Translate the proposed Premisses into abstract form.

(4) Represent them, together, on a Triliteral Diagram.

(5) Ascertain what Proposition, if any, in terms of x and y, is also represented on

it.

(6) Translate this into concrete form.

It is evident that, if the proposed Premisses were true, this other Proposition would also be true. Hence it is a Conclusion consequent from the proposed Premisses.

[Let us work some examples.

(1)

“No son of mine is dishonest;

People always treat an honest man with respect”.

Taking “men” as Univ., we may write these as follows:—

“No sons of mine are dishonest men;

All honest men are men treated with respect”.

We can now construct our Dictionary, viz. m = honest; x = sons of mine; y = treated with respect.

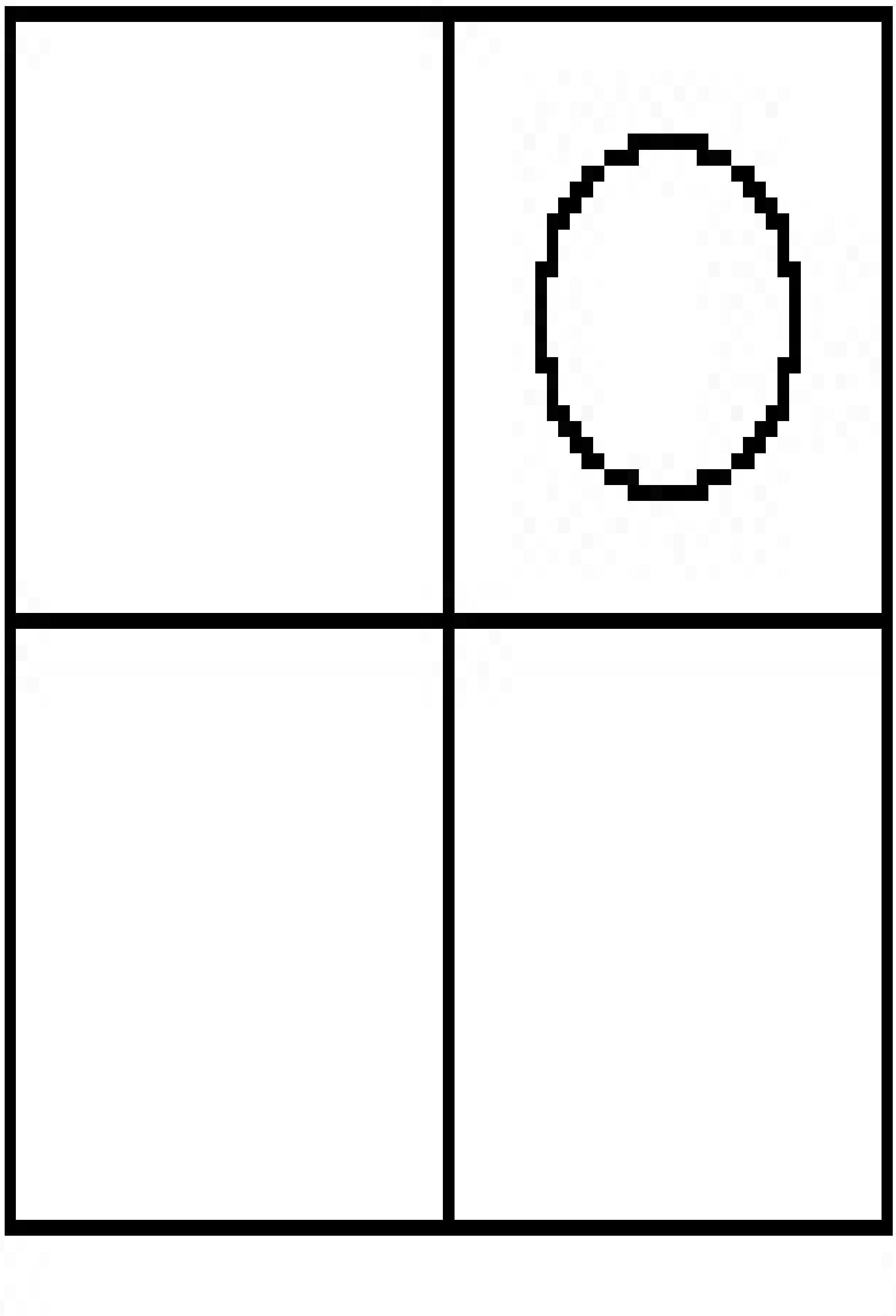
(Note that the expression “x = sons of mine” is an abbreviated form of “x = the Differentia of ‘sons of mine’, when regarded as a Species of ‘men’”.)

The next thing is to translate the proposed Premisses into abstract form, as

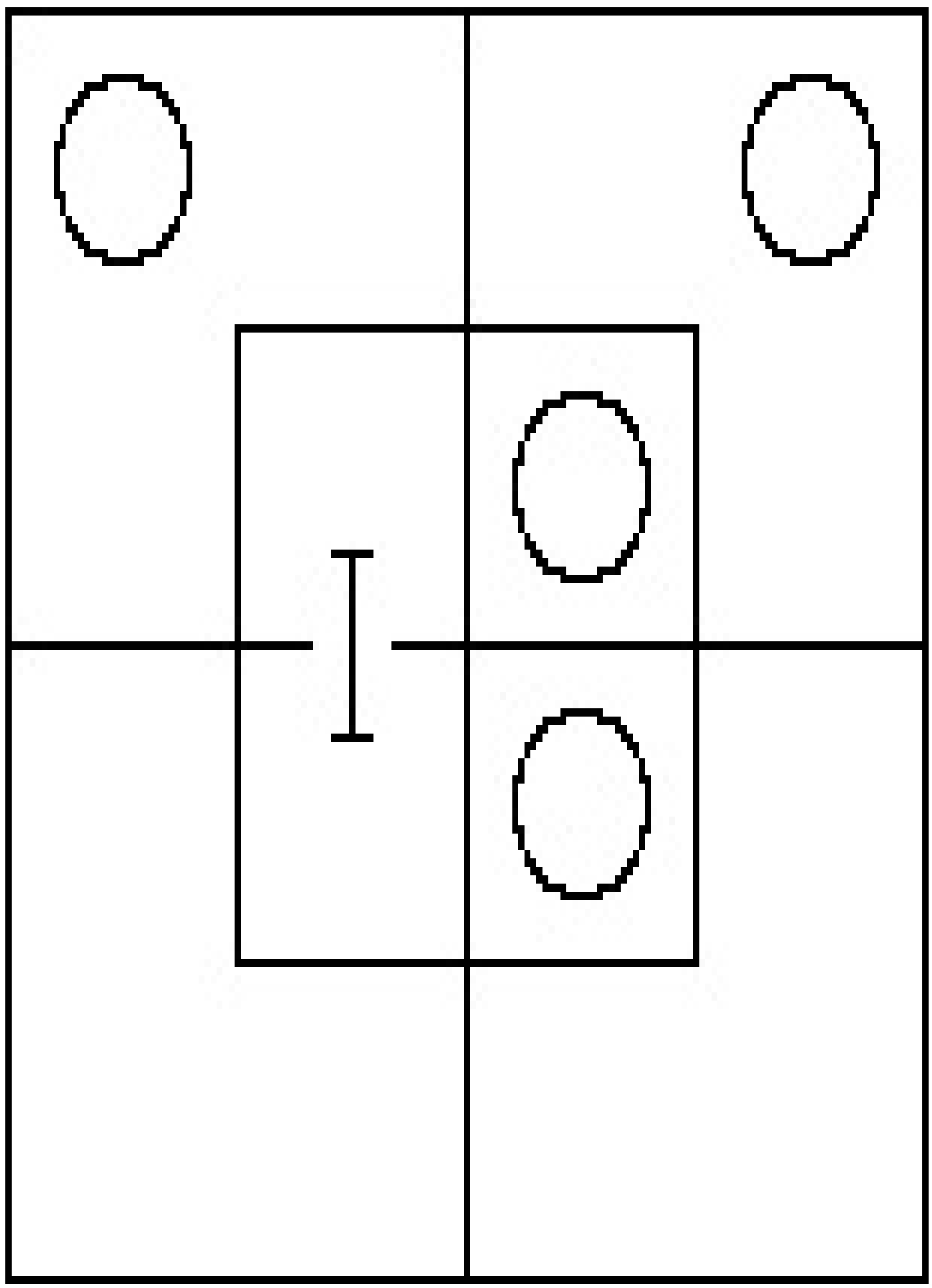
follows:—

“No x are m′;

All m are y”.



Next, by the process described at p. 50, we represent these on a Triliteral Diagram, thus:—



Next, by the process described at p. 53, we transfer to a Biliteral Diagram all the information we can.

The result we read as “No x are y′” or as “No y′ are x,” whichever we prefer. So we refer to our Dictionary, to see which will look best; and we choose

“No x are y′”,

which, translated into concrete form, is

“No son of mine fails to be treated with respect”.

(2)

“All cats understand French;

Some chickens are cats”.

Taking “creatures” as Univ., we write these as follows:—

“All cats are creatures understanding French;

Some chickens are cats”.

We can now construct our Dictionary, viz. m = cats; x = understanding French; y = chickens.

The proposed Premisses, translated into abstract form, are

“All m are x;

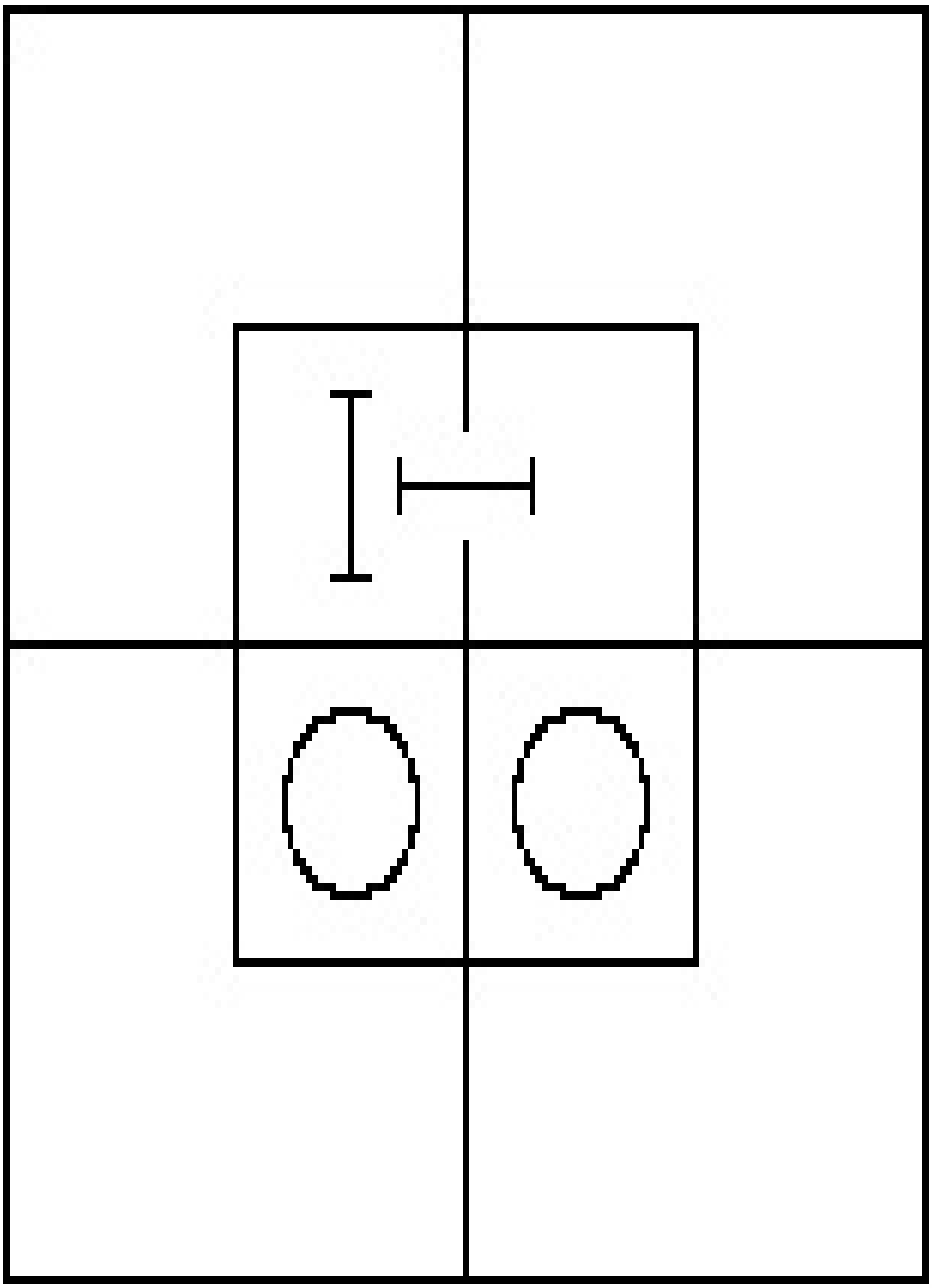
Some y are m”.

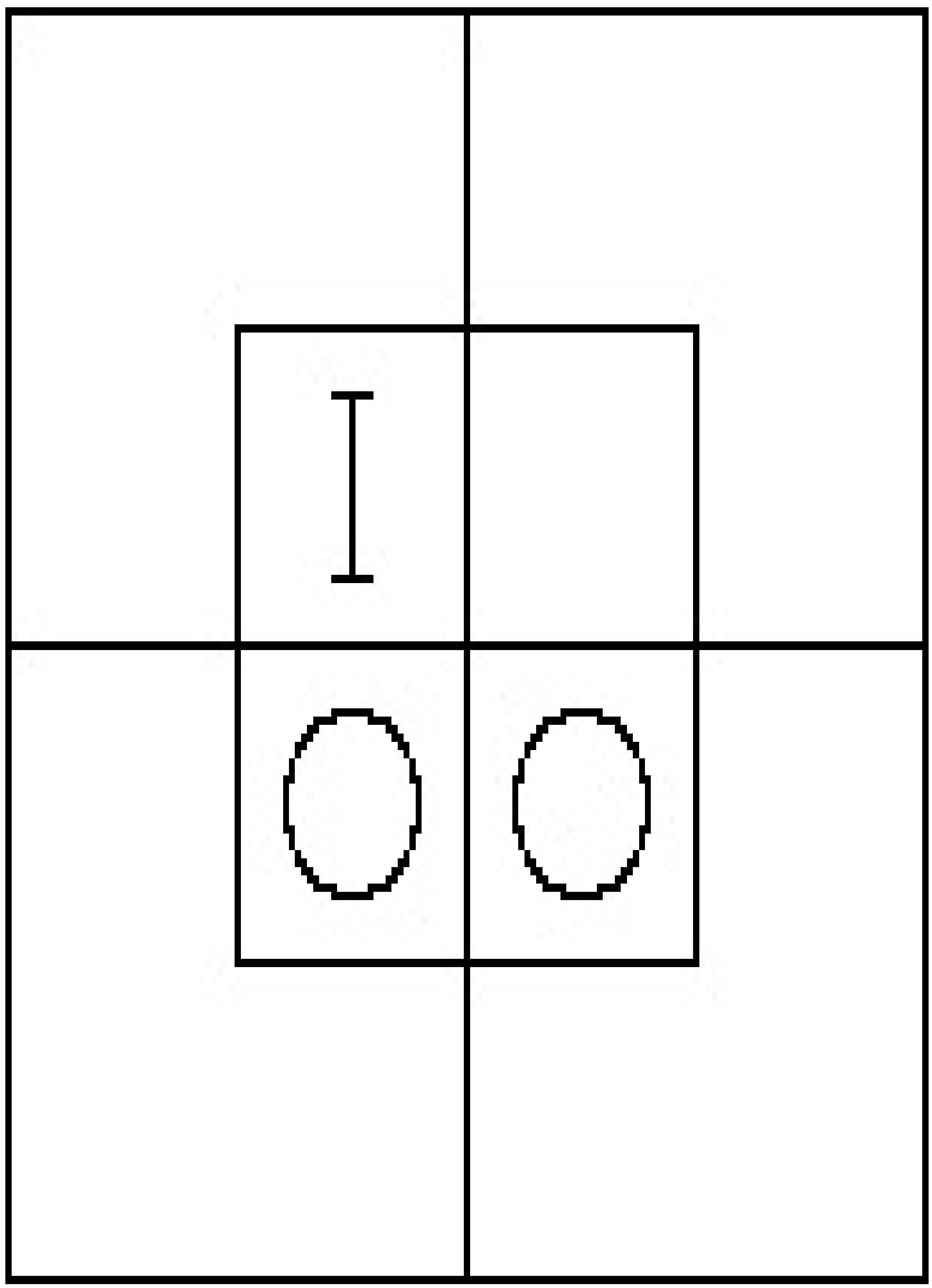
In order to represent these on a Triliteral Diagram, we break up the first into the two Propositions to which it is equivalent, and thus get the three Propositions

(1) “Some m are x;

(2) No m are x′;

(3) Some y are m”.

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The Rule, given at p. 50, would make us take these in the order 2, 1, 3.

This, however, would produce the result

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So it would be better to take them in the order 2, 3, 1. Nos. (2) and (3) give us the result here shown; and now we need not trouble about No. (1), as the Proposition “Some m are x” is already represented on the Diagram.

Transferring our information to a Biliteral Diagram, we get

This result we can read either as “Some x are y” or “Some y are x”.

After consulting our Dictionary, we choose

“Some y are x”,

which, translated into concrete form, is

“Some chickens understand French.”

(3)

“All diligent students are successful;

All ignorant students are unsuccessful”.

Let Univ. be “students”; m = successful; x = diligent; y = ignorant.

These Premisses, in abstract form, are

“All x are m;

All y are m′”.

These, broken up, give us the four Propositions

(1) “Some x are m;

(2) No x are m′;

(3) Some y are m′;

(4) No y are m”.

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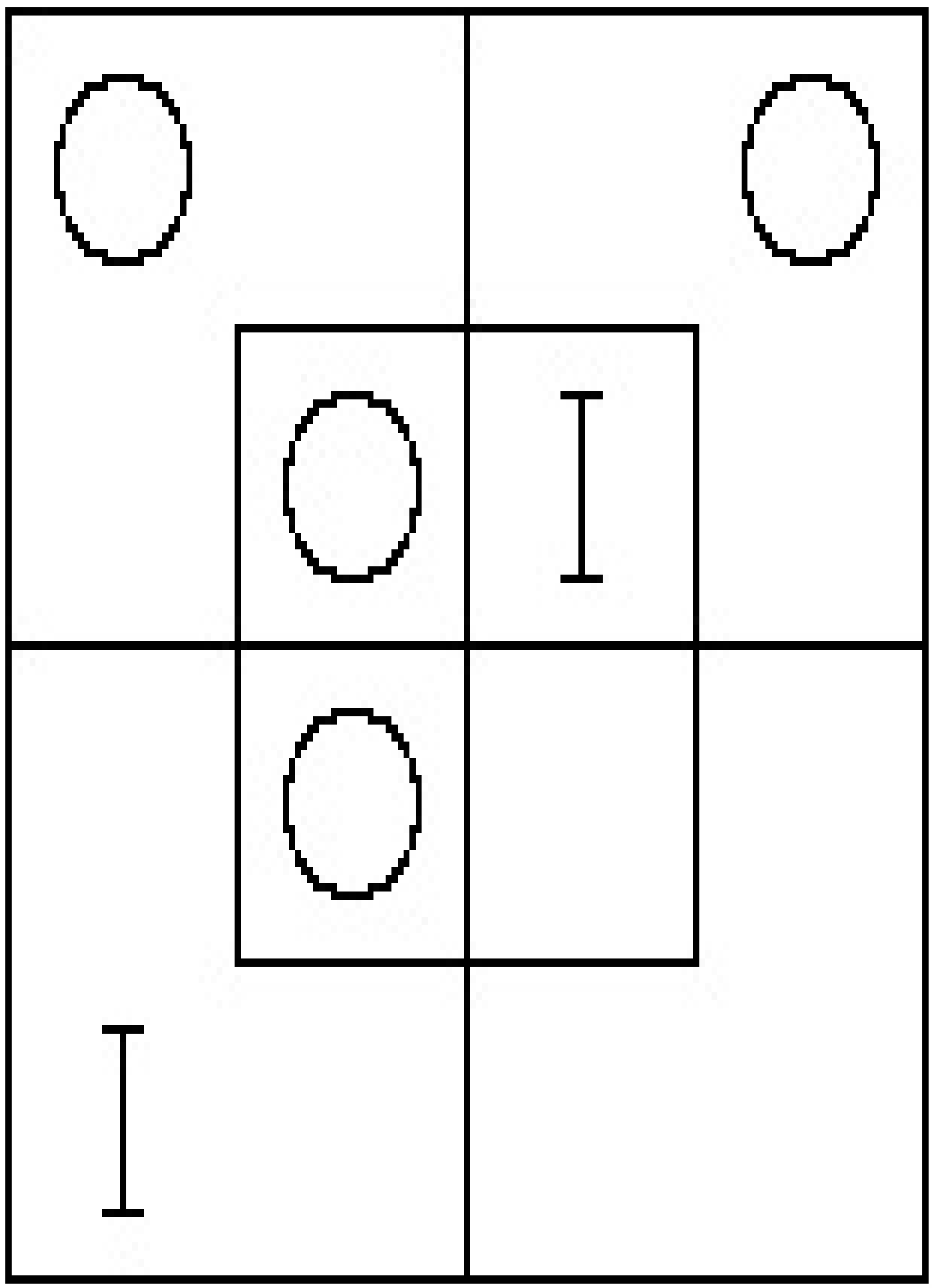
which we will take in the order 2, 4, 1, 3.

Representing these on a Triliteral Diagram, we get



And this information, transferred to a Biliteral Diagram, is

Here we get two Conclusions, viz.

“All x are y′;

All y are x′.”

And these, translated into concrete form, are

“All diligent students are (not-ignorant, i.e.) learned;

All ignorant students are (not-diligent, i.e.) idle”. (See p. 4.)

(4)

“Of the prisoners who were put on their trial at the last

Assizes, all, against whom the verdict ‘guilty’ was

returned, were sentenced to imprisonment;

Some, who were sentenced to imprisonment, were also

sentenced to hard labour”.

Let Univ. be “the prisoners who were put on their trial at the last Assizes”; m =

who were sentenced to imprisonment; x = against whom the verdict ‘guilty’ was returned; y = who were sentenced to hard labour.

The Premisses, translated into abstract form, are

“All x are m;

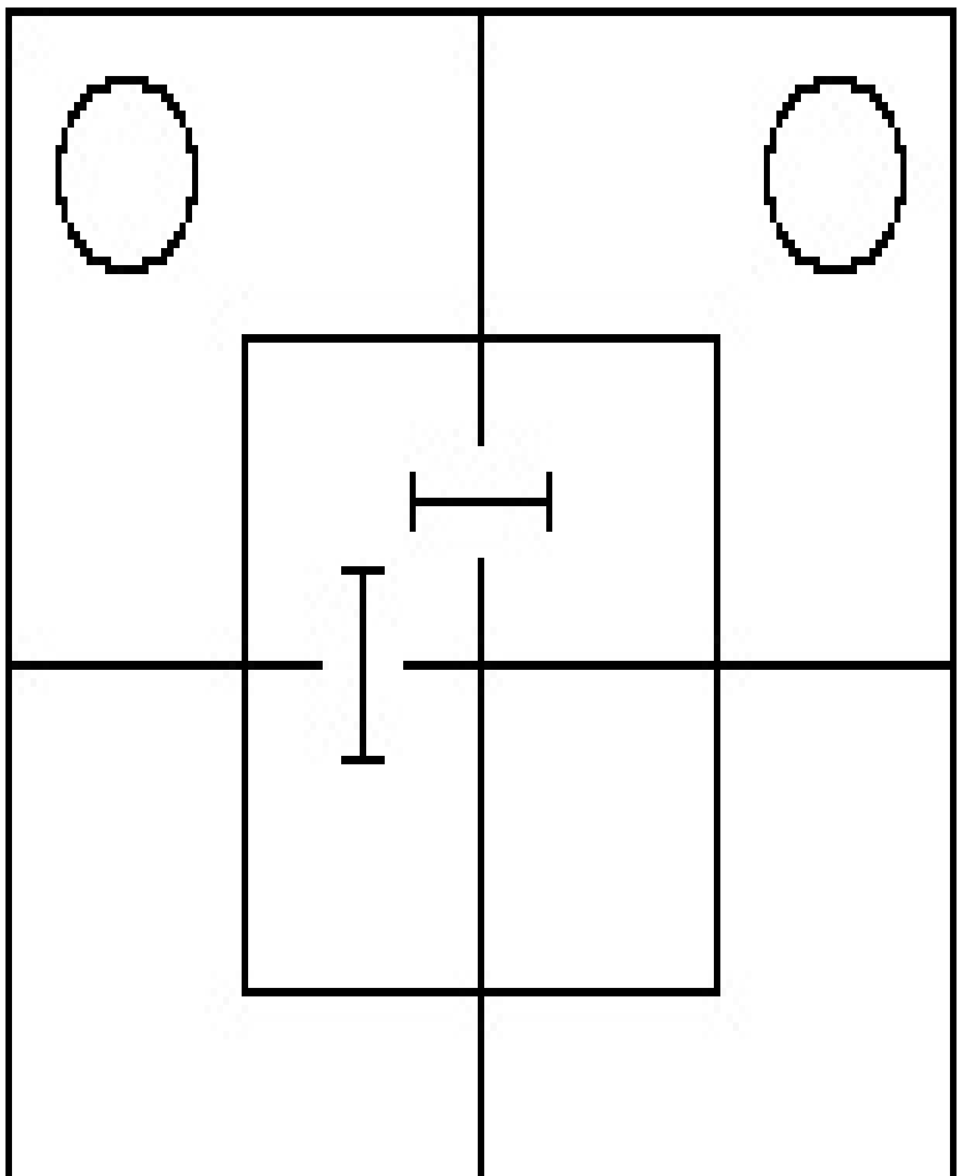
Some m are y”.

Breaking up the first, we get the three

(1) “Some x are m;

(2) No x are m′;

(3) Some m are y”.



Representing these, in the order 2, 1, 3, on a Triliteral Diagram, we get

Here we get no Conclusion at all.

You would very likely have guessed, if you had seen only the Premisses, that the Conclusion would be

“Some, against whom the verdict ‘guilty’ was returned,

were sentenced to hard labour”.

But this Conclusion is not even true, with regard to the Assizes I have here invented.

“Not true!” you exclaim. “Then who were they, who were sentenced to imprisonment and were also sentenced to hard labour? They must have had the verdict ‘guilty’ returned against them, or how could they be sentenced?”

Well, it happened like this, you see. They were three ruffians, who had committed highway-robbery. When they were put on their trial, they pleaded ‘guilty’. So no verdict was returned at all; and they were sentenced at once.]

I will now work out, in their briefest form, as models for the Reader to imitate in working examples, the above four concrete Problems.

(1) [see p. 60]

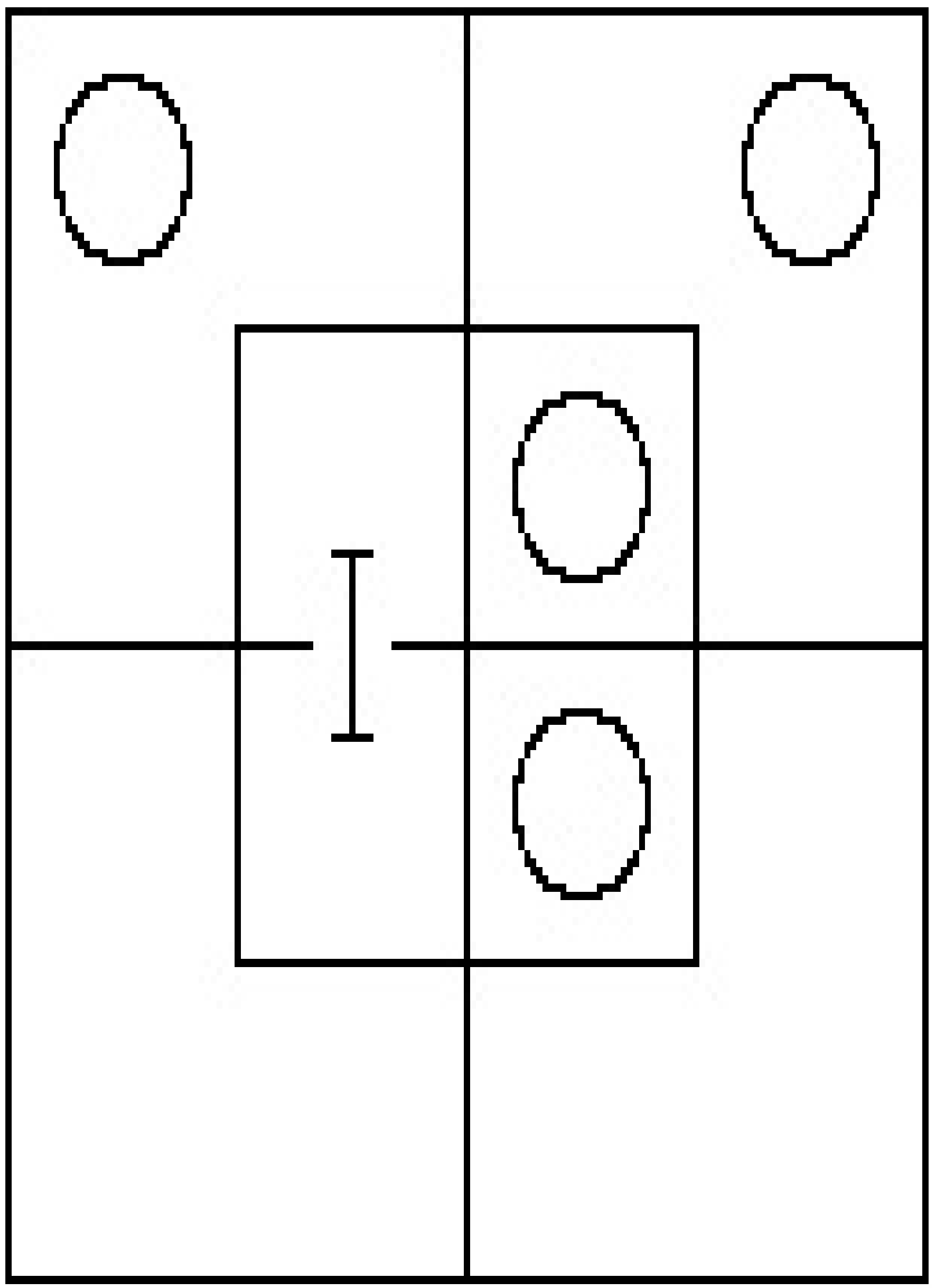
“No son of mine is dishonest;

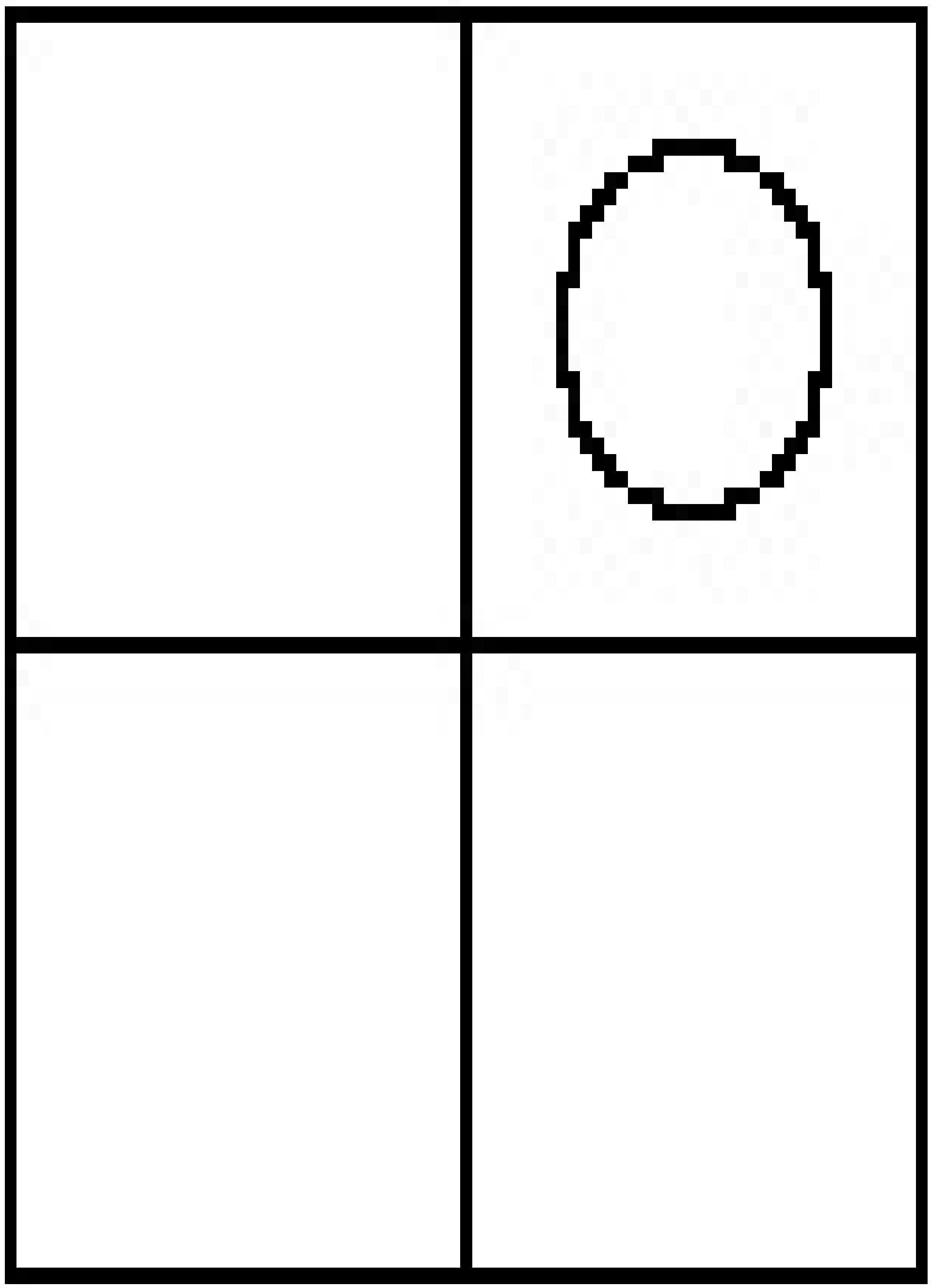
People always treat an honest man with respect.”

Univ. “men”; m = honest; x = my sons; y = treated with respect.

“No x are m′;

All m are y.”





$\therefore$ "No x are y′."

i.e. "No son of mine ever fails to be treated with respect."

(2) [see p. 61]

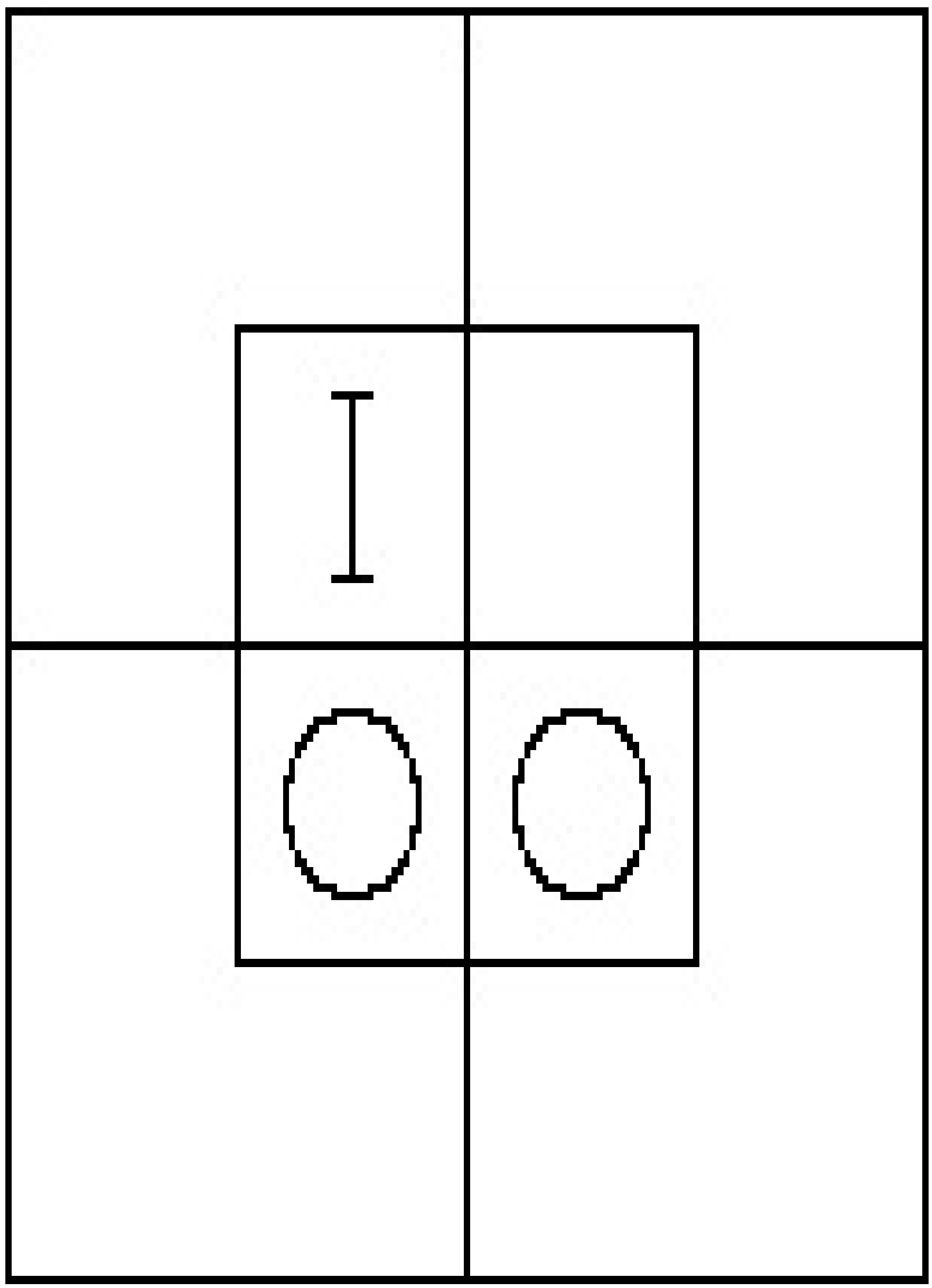
"All cats understand French;

Some chickens are cats".

Univ. "creatures"; m = cats; x = understanding French; y = chickens.

"All m are x;

Some y are m."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∴ “Some y are x.”

i.e. “Some chickens understand French.”

(3) **[see p. 62]**

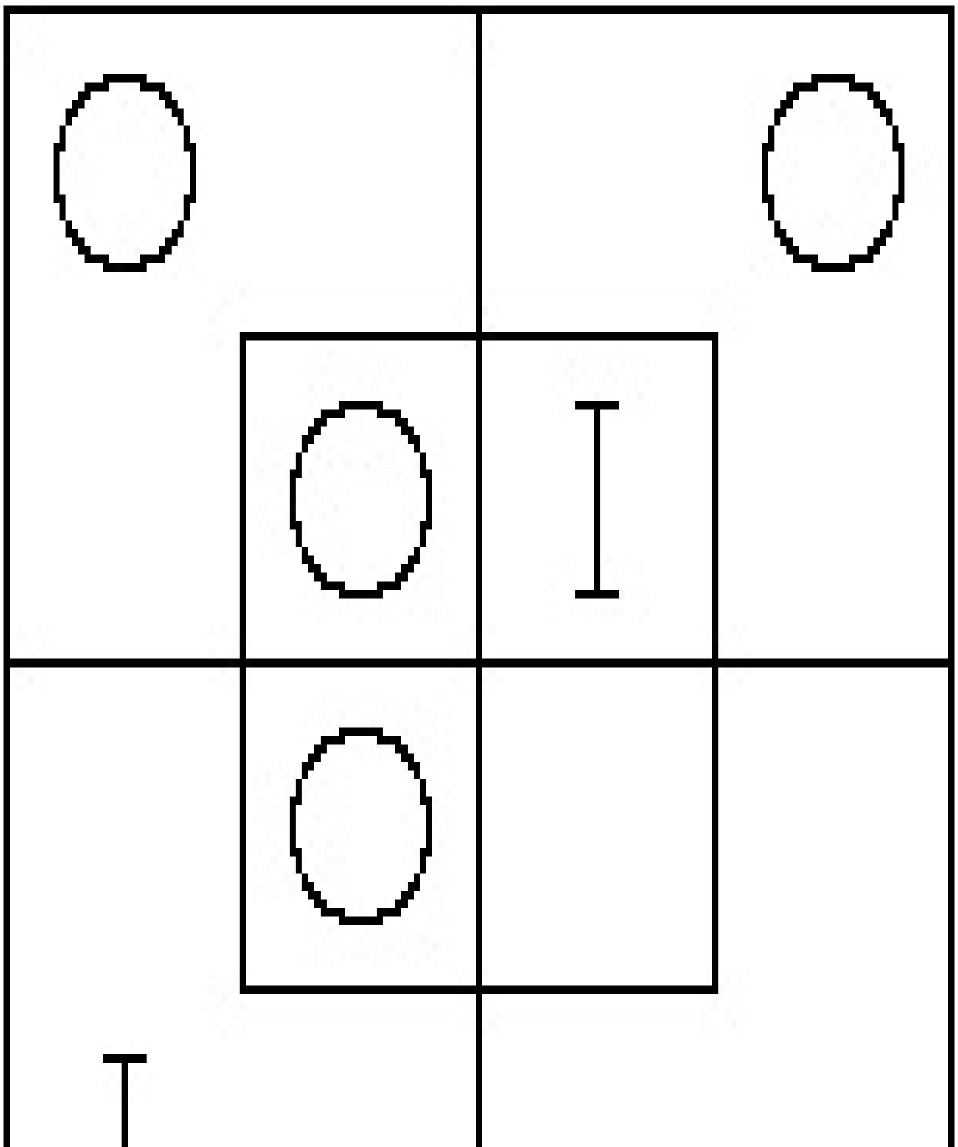
“All diligent students are successful;

All ignorant students are unsuccessful”.

Univ. “students”; m = successful; x = diligent; y = ignorant.

“All x are m;

All y are m′.”



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∴ “All x are y′;

All y are x′.”

i.e. “All diligent students are learned; and all ignorant students are idle”.

(4) [see p. 63]

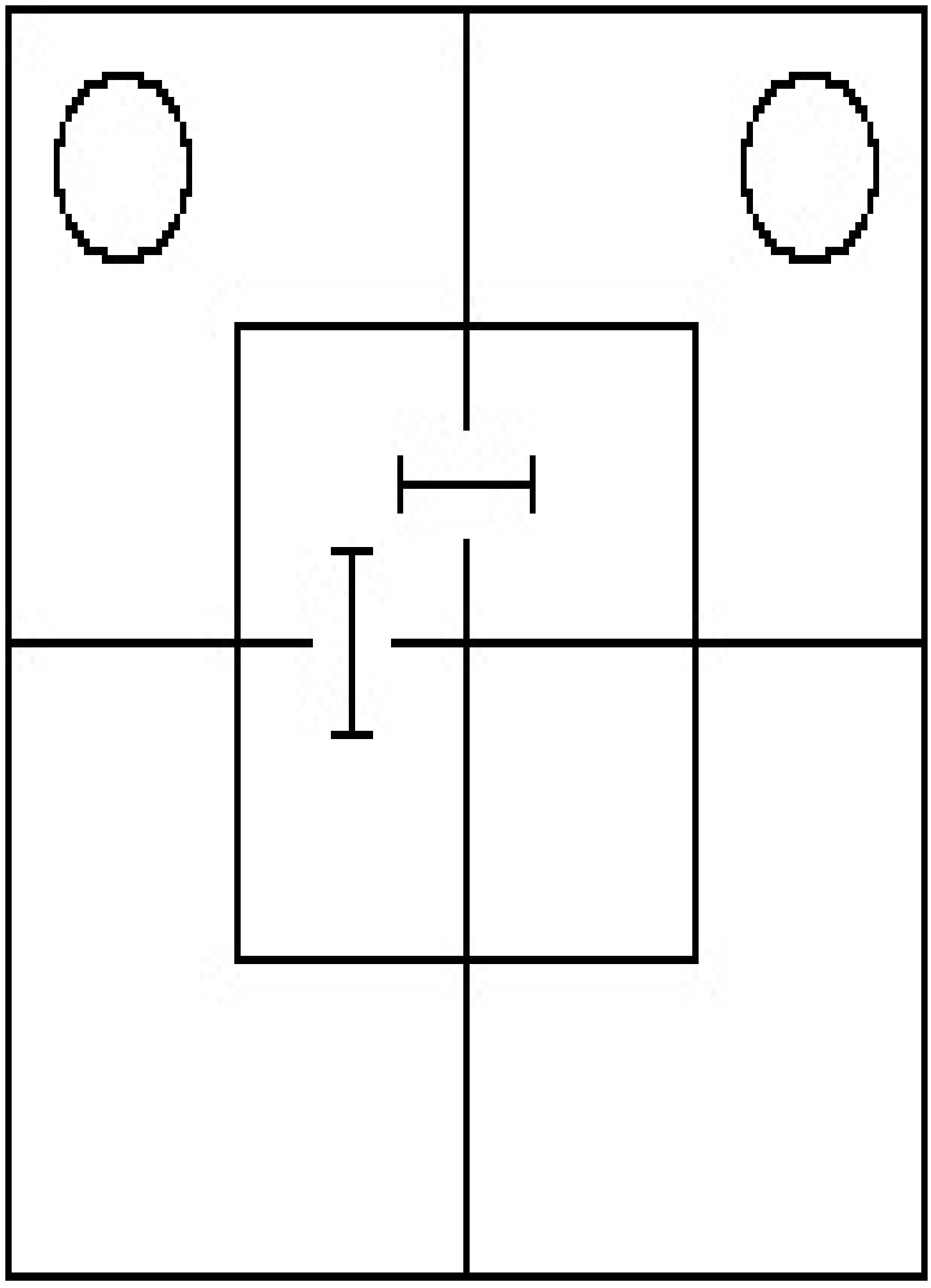
“Of the prisoners who were put on their trial at the last Assizes, all, against whom the verdict ‘guilty’ was returned, were sentenced to imprisonment;

Some, who were sentenced to imprisonment, were also sentenced to hard labour”.

Univ. “prisoners who were put on their trial at the last Assizes”, m = sentenced to imprisonment; x = against whom the verdict ‘guilty’ was returned; y = sentenced to hard labour.

“All x are m;

Some m are y.”



There is no Conclusion.

[Review Tables VII, VIII (pp. 48, 49). Work Examples § 1, 17–21 (p. 97); § 4, 1–6 (p. 100); § 5, 1–6 (p. 101).]

§ 3.

Given a Trio of Propositions of Relation, of which every two contain a Pair of codivisional Classes, and which are proposed as a Syllogism; to ascertain whether the proposed Conclusion is consequent from the proposed Premisses, and, if so, whether it is complete.

The Rules, for doing this, are as follows:—

(1) Take the proposed Premisses, and ascertain, by the process described at p. 60, what Conclusion, if any, is consequent from them.

(2) If there be no Conclusion, say so.

(3) If there be a Conclusion, compare it with the proposed Conclusion, and pronounce accordingly.

I will now work out, in their briefest form, as models for the Reader to imitate in

working examples, six Problems.

(1)

“All soldiers are strong;

All soldiers are brave.

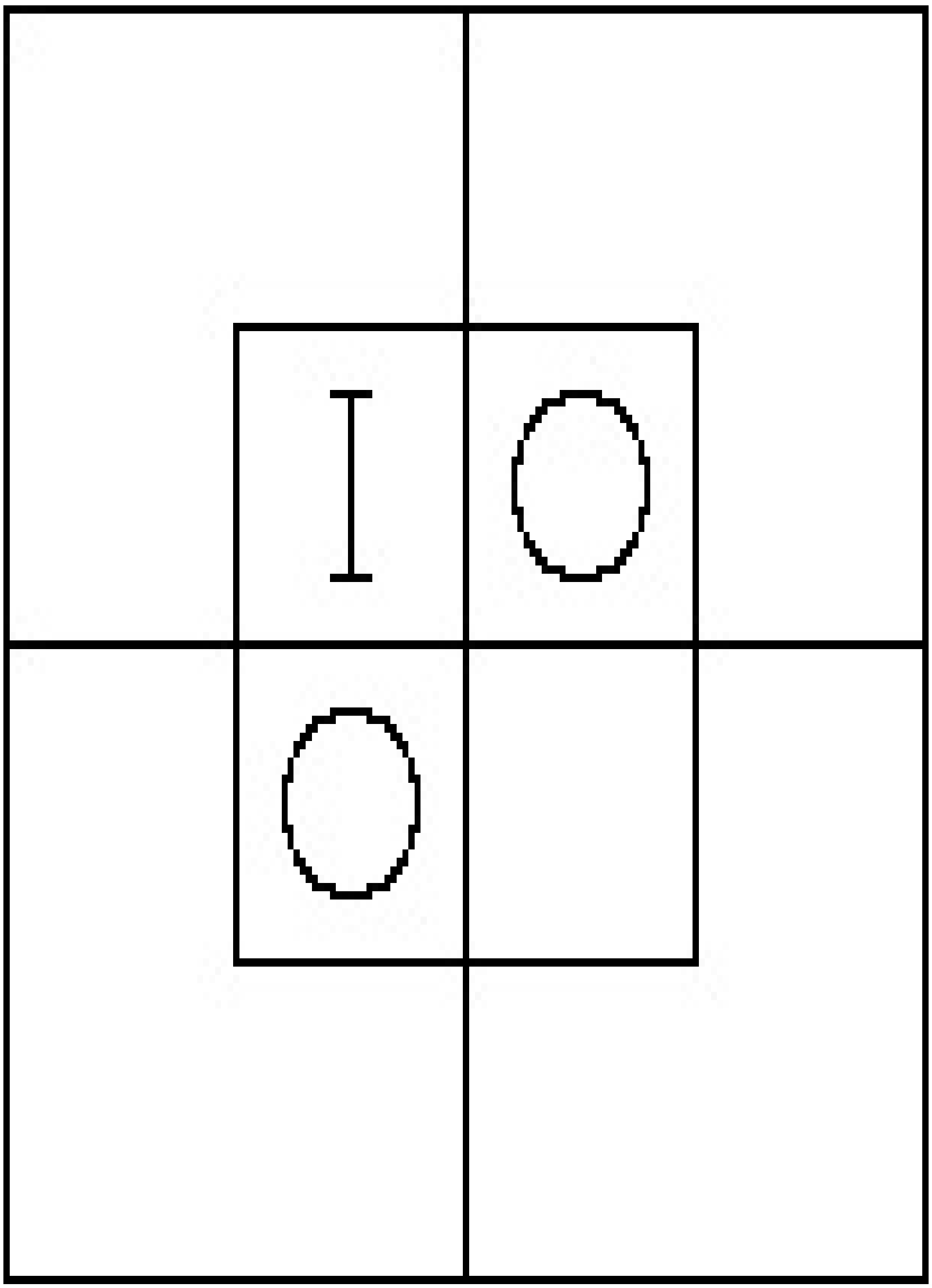
Some strong men are brave.”

Univ. “men”; m = soldiers; x = strong; y = brave.

“All m are x;

All m are y.

Some x are y.”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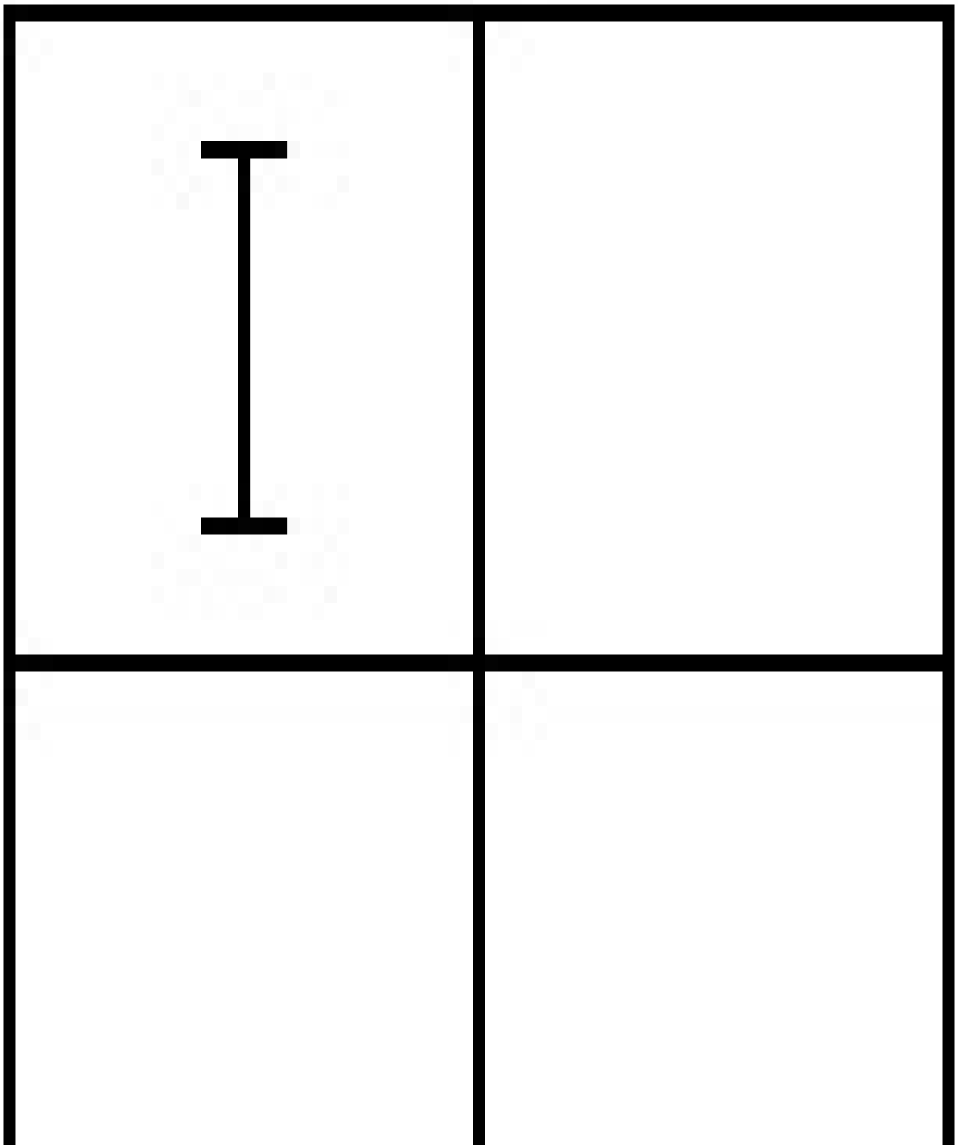
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∴ “Some x are y.”

Hence proposed Conclusion is right.

(2)

“I admire these pictures;

When I admire anything I wish to examine it thoroughly.

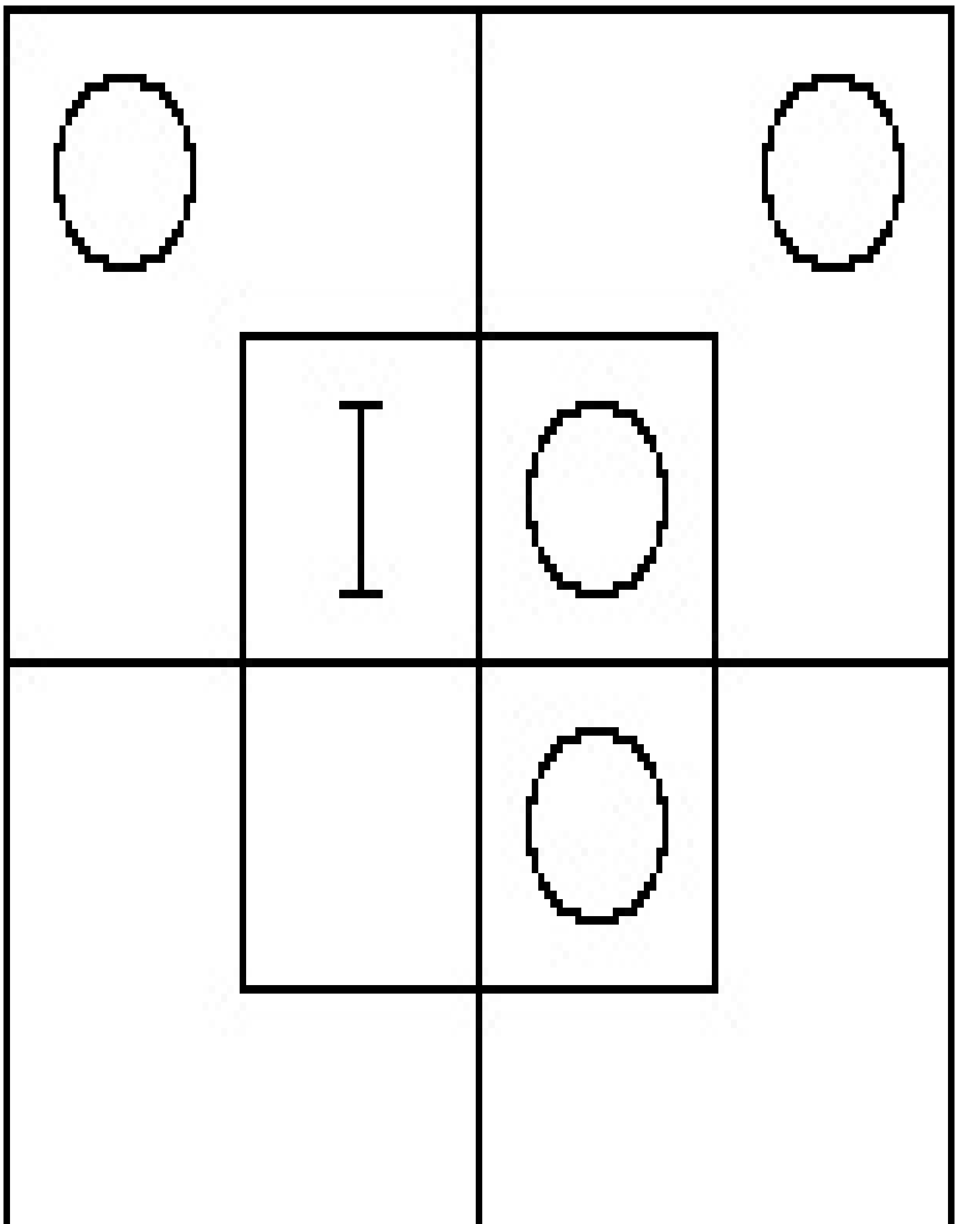
I wish to examine some of these pictures thoroughly.”

Univ. “things”; m = admired by me; x = these pictures; y = things which I wish to examine thoroughly.

“All x are m;

All m are y.

Some x are y.”



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$\therefore$ “All x are y.”

Hence proposed Conclusion is incomplete, the complete one being “I wish to examine all these pictures thoroughly”.

(3)

“None but the brave deserve the fair;

Some braggarts are cowards.

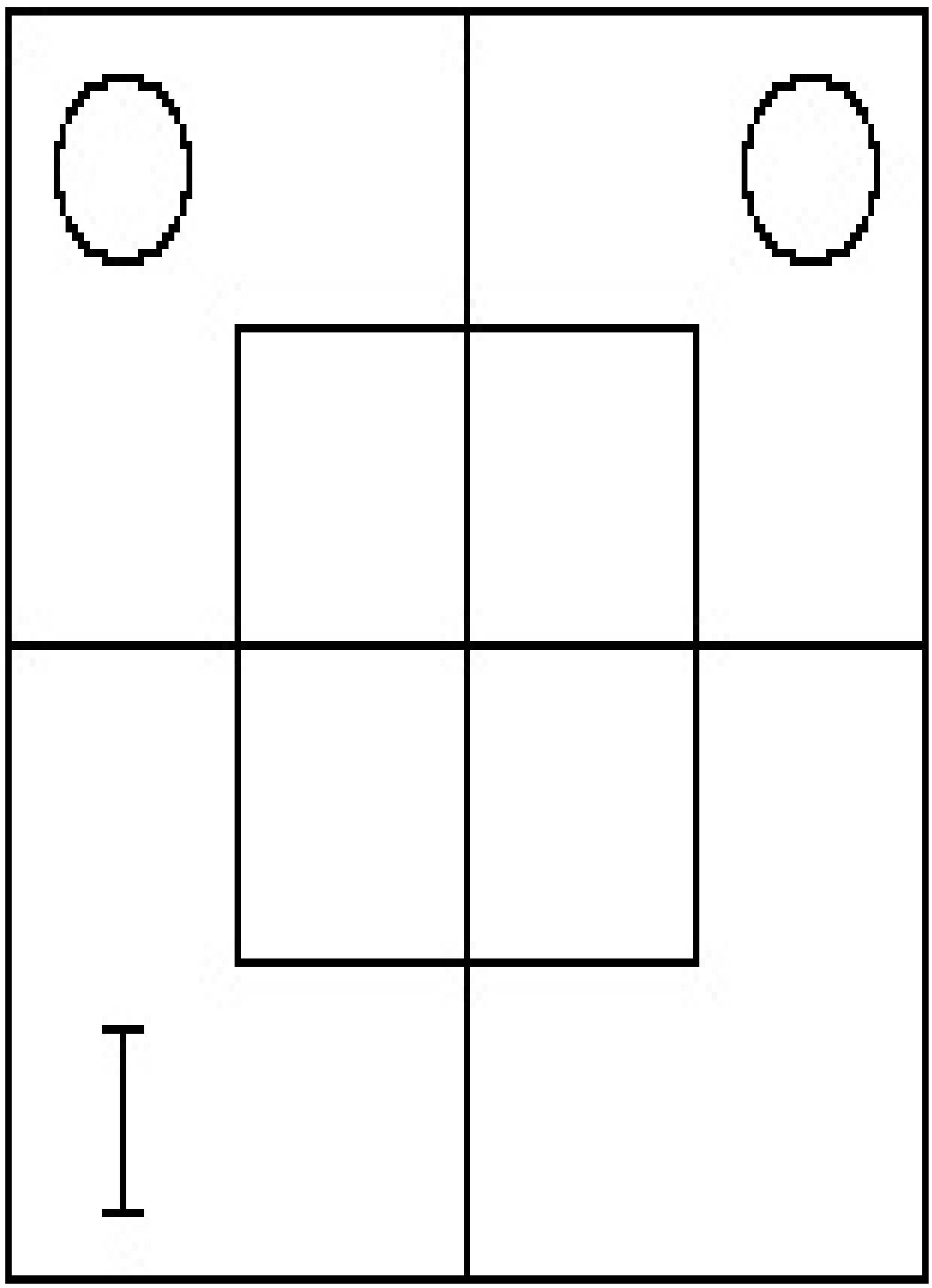
Some braggarts do not deserve the fair.”

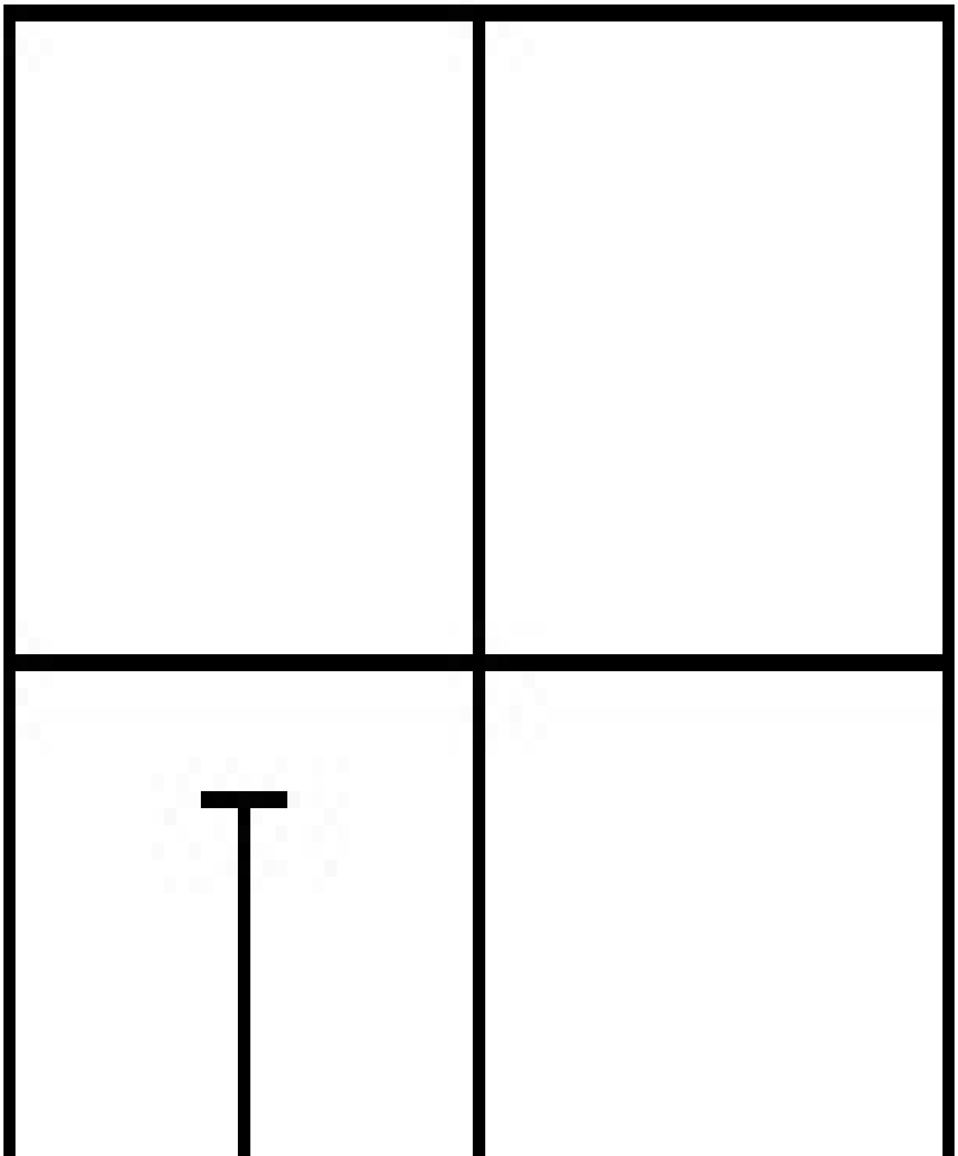
Univ. “persons”; m = brave; x = deserving of the fair; y = braggarts.

“No m′ are x;

Some y are m′.

Some y are x′.”





∴ “Some y are x′.”

Hence proposed Conclusion is right.

(4)

“All soldiers can march;

Some babies are not soldiers.

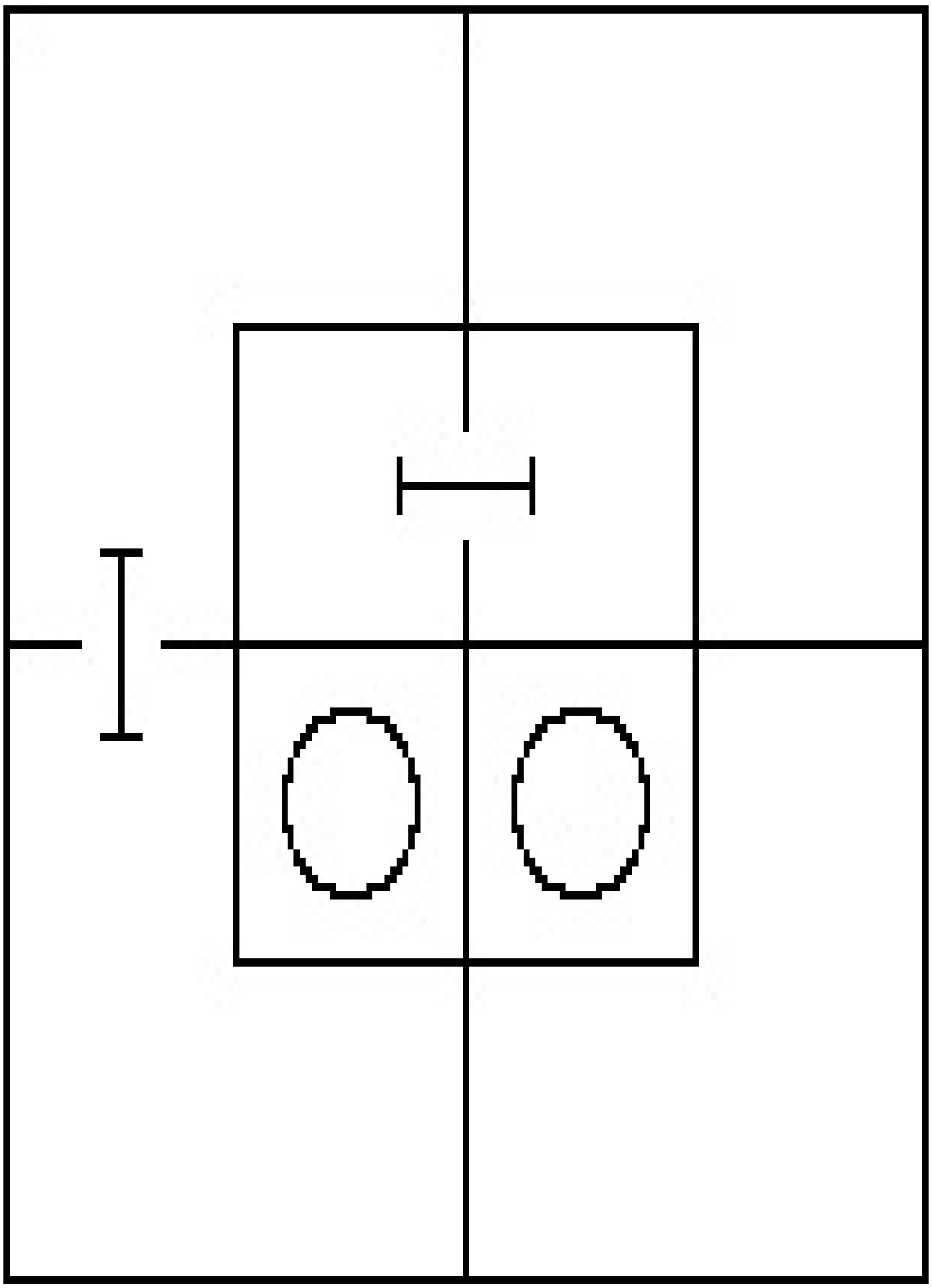
Some babies cannot march”.

Univ. “persons”; m = soldiers; x = able to march; y = babies.

“All m are x;

Some y are m′.

Some y are x′.”



There is no Conclusion.

(5)

“All selfish men are unpopular;

All obliging men are popular.

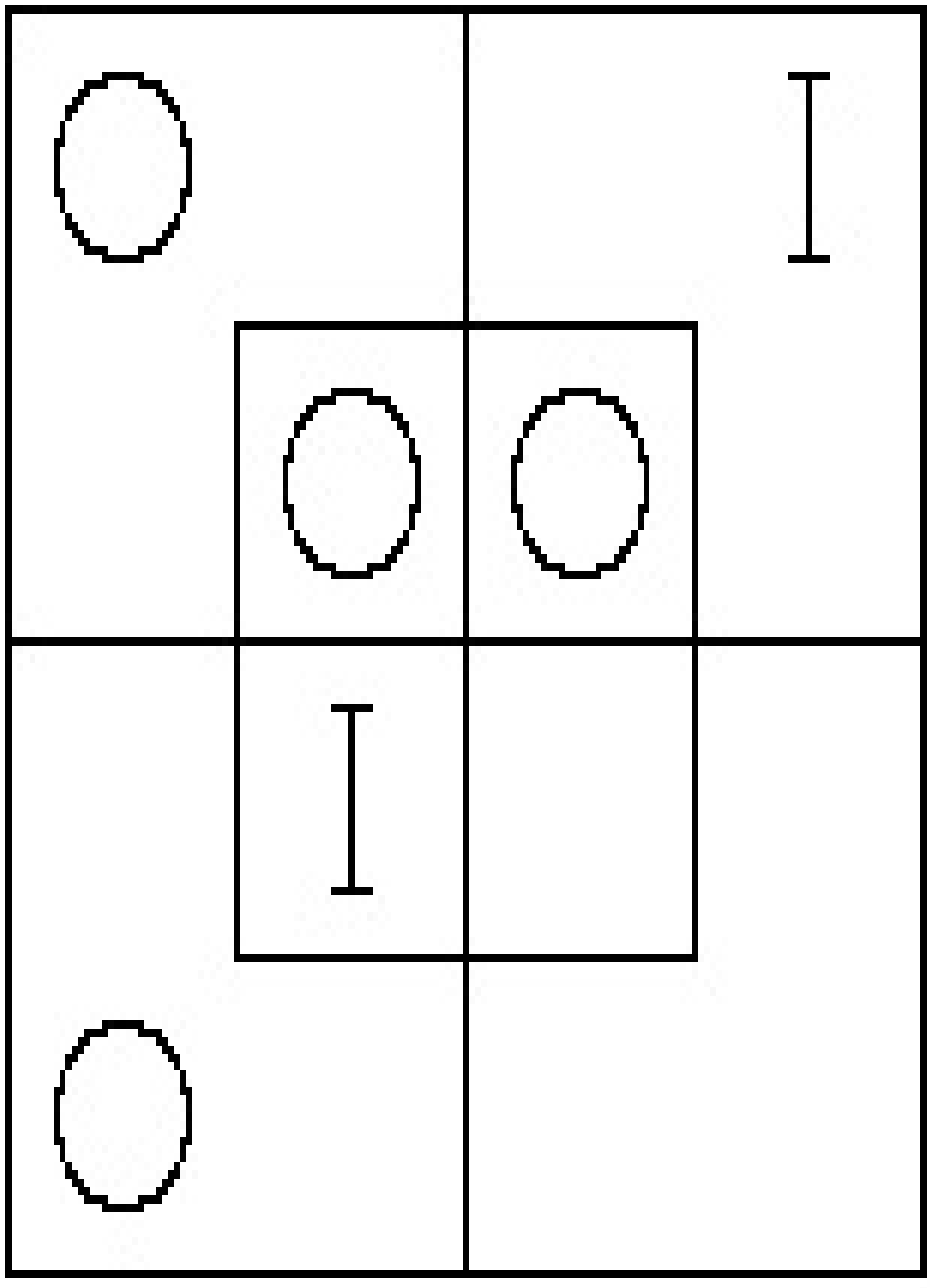
All obliging men are unselfish”.

Univ. “men”; m = popular; x = selfish; y = obliging.

“All x are m′;

All y are m.

All y are x′.”



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$\therefore$ "All x are y′;

All y are x′."

Hence proposed Conclusion is incomplete, the complete one containing, in addition, "All selfish men are disobliging".

(6)

"No one, who means to go by the train and cannot get a conveyance, and has not enough time to walk to the station, can do without running;

This party of tourists mean to go by the train and cannot get a conveyance, but they have plenty of time to walk to the station.

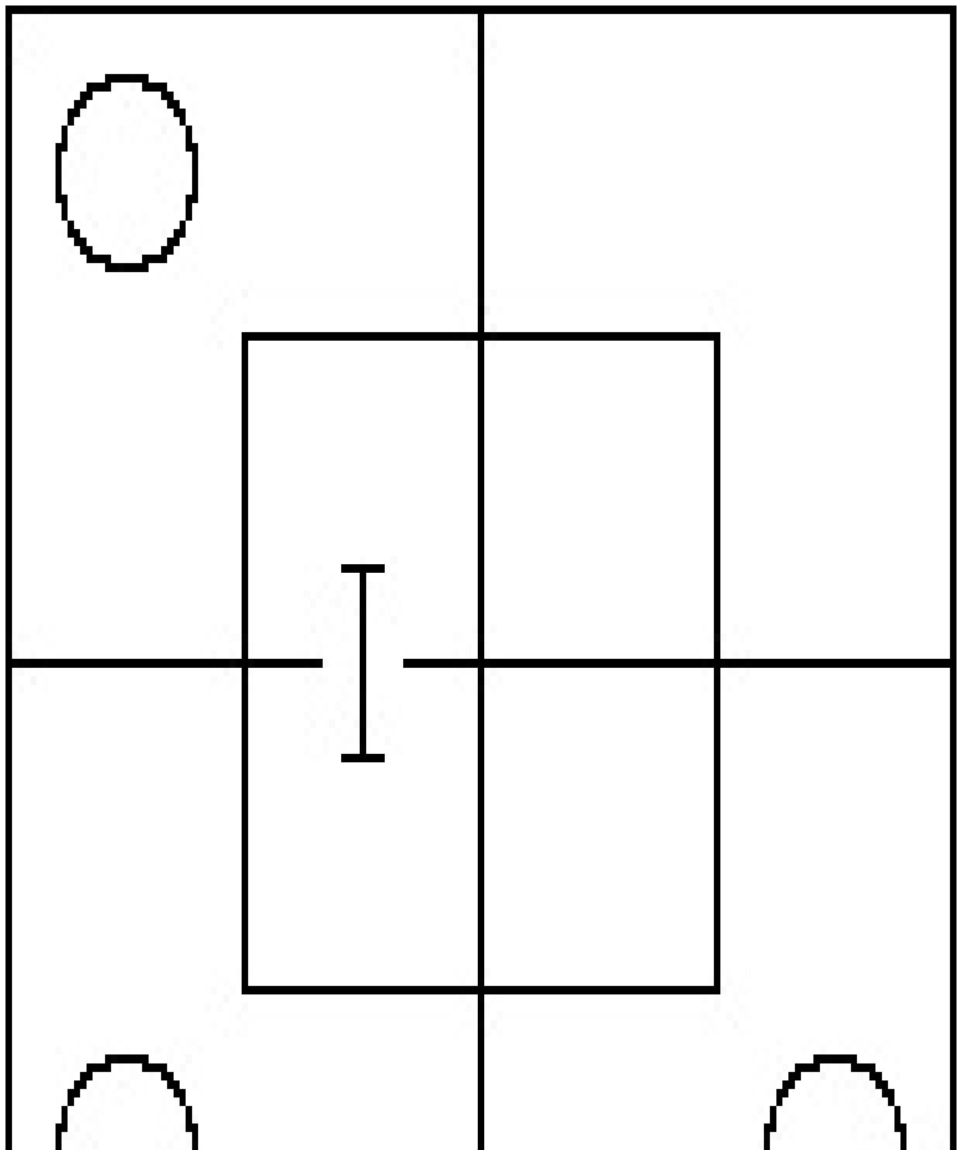
This party of tourists need not run."

Univ. "persons meaning to go by the train, and unable to get a conveyance"; m = having enough time to walk to the station; x = needing to run; y = these tourists.

"No m′ are x′;

All y are m.

All y are x′."



There is no Conclusion.

[Here is another opportunity, gentle Reader, for playing a trick on your innocent friend. Put the proposed Syllogism before him, and ask him what he thinks of the Conclusion.

He will reply “Why, it’s perfectly correct, of course! And if your precious Logic-book tells you it isn’t, don’t believe it! You don’t mean to tell me those tourists need to run? If I were one of them, and knew the Premisses to be true, I should be quite clear that I needn’t run—and I should walk!”

And you will reply “But suppose there was a mad bull behind you?”

And then your innocent friend will say “Hum! Ha! I must think that over a bit!”

You may then explain to him, as a convenient test of the soundness of a Syllogism, that, if circumstances can be invented which, without interfering with the truth of the Premisses, would make the Conclusion false, the Syllogism must be unsound.]

[Review Tables V–VIII (pp. 46–49). Work Examples § 4, 7–12 (p. 100); § 5, 7–12 (p. 101); § 6, 1–10 (p. 106); § 7, 1–6 (pp. 107, 108).]

BOOK VI.

THE METHOD OF SUBSCRIPTS.

CHAPTER I.

INTRODUCTORY.

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Let us agree that “x1” shall mean “Some existing Things have the Attribute x”, i.e. (more briefly) “Some x exist”; also that “xy1” shall mean “Some xy exist”, and so on. Such a Proposition may be called an ‘Entity.’

[Note that, when there are two letters in the expression, it does not in the least matter which stands first: “xy1” and “yx1” mean exactly the same.]

Also that “x0” shall mean “No existing Things have the Attribute x”, i.e. (more briefly) “No x exist”; also that “xy0” shall mean “No xy exist”, and so on. Such a Proposition may be called a ‘Nullity’.

Also that “†” shall mean “and”.

[Thus “ab1 † cd0” means “Some ab exist and no cd exist”.]

Also that “¶” shall mean “would, if true, prove”.

[Thus, “x0 ¶ xy0” means “The Proposition ‘No x exist’ would, if true, prove the

Proposition ‘No xy exist’”.]

When two Letters are both of them accented, or both not accented, they are said to have ‘Like Signs’, or to be ‘Like’: when one is accented, and the other not, they are said to have ‘Unlike Signs’, or to be ‘Unlike’.

CHAPTER II.

REPRESENTATION OF PROPOSITIONS OF RELATION.

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Let us take, first, the Proposition “Some x are y”.

This, we know, is equivalent to the Proposition of Existence “Some xy exist”. (See p. 31.) Hence it may be represented by the expression “xy1”.

The Converse Proposition “Some y are x” may of course be represented by the same expression, viz. “xy1”.

Similarly we may represent the three similar Pairs of Converse Propositions, viz. —

“Some x are y′” = “Some y′ are x”,

“Some x′ are y” = “Some y are x′”,

“Some x′ are y′” = “Some y′ are x′”.

Let us take, next, the Proposition “No x are y”.

This, we know, is equivalent to the Proposition of Existence “No xy exist”. (See p. 33.) Hence it may be represented by the expression “xy0”.

The Converse Proposition “No y are x” may of course be represented by the same expression, viz. “xy0”.

Similarly we may represent the three similar Pairs of Converse Propositions, viz. —

“No x are y′” = “No y′ are x”,

“No x′ are y” = “No y are x′”,

“No x′ are y′” = “No y′ are x′”.

Let us take, next, the Proposition “All x are y”.

Now it is evident that the Double Proposition of Existence “Some x exist and no xy′ exist” tells us that some x-Things exist, but that none of them have the Attribute y′: that is, it tells us that all of them have the Attribute y: that is, it tells us that “All x are y”.

Also it is evident that the expression “x1 † xy′0” represents this Double Proposition.

Hence it also represents the Proposition “All x are y”.

[The Reader will perhaps be puzzled by the statement that the Proposition “All x are y” is equivalent to the Double Proposition “Some x exist and no xy′ exist,” remembering that it was stated, at p. 33, to be equivalent to the Double Proposition “Some x are y and no x are y′” (i.e. “Some xy exist and no xy′ exist”). The explanation is that the Proposition “Some xy exist” contains superfluous information. “Some x exist” is enough for our purpose.]

This expression may be written in a shorter form, viz. “x1y′0”, since each Subscript takes effect back to the beginning of the expression.

Similarly we may represent the seven similar Propositions “All x are y′”, “All x′

are y”, “All x′ are y′”, “All y are x”, “All y are x′”, “All y′ are x”, and “All y′ are x′”.

[The Reader should make out all these for himself.]

It will be convenient to remember that, in translating a Proposition, beginning with “All”, from abstract form into subscript form, or vice versâ, the Predicate changes sign (that is, changes from positive to negative, or else from negative to positive).

[Thus, the Proposition “All y are x′” becomes “y1x0”, where the Predicate changes from x′ to x.

Again, the expression “x′1y′0” becomes “All x′ are y”, where the Predicate changes for y′ to y.]

CHAPTER III.

SYLLOGISMS.

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§ 1.

Representation of Syllogisms.

We already know how to represent each of the three Propositions of a Syllogism in subscript form. When that is done, all we need, besides, is to write the three expressions in a row, with “†” between the Premisses, and “¶” before the Conclusion.

[Thus the Syllogism

“No x are m′;

All m are y.

∴ No x are y′.”

may be represented thus:—

xm′0 † m1y′0 ¶ xy′0

When a Proposition has to be translated from concrete form into subscript form, the Reader will find it convenient, just at first, to translate it into abstract form, and thence into subscript form. But, after a little practice, he will find it quite easy to go straight from concrete form to subscript form.]

§ 2.

Formulæ for solving Problems in Syllogisms.

When once we have found, by Diagrams, the Conclusion to a given Pair of Premisses, and have represented the Syllogism in subscript form, we have a Formula, by which we can at once find, without having to use Diagrams again, the Conclusion to any other Pair of Premisses having the same subscript forms.

[Thus, the expression

xm0 † ym′0 ¶ xy0

is a Formula, by which we can find the Conclusion to any Pair of Premisses whose subscript forms are

$xm_0 \dagger ym'_0$

For example, suppose we had the Pair of Propositions

“No gluttons are healthy;

No unhealthy men are strong”.

proposed as Premisses. Taking “men” as our ‘Universe’, and making m = healthy; x = gluttons; y = strong; we might translate the Pair into abstract form, thus:—

“No x are m;

No m′ are y”.

These, in subscript form, would be

$xm_0 \dagger m'y_0$

which are identical with those in our Formula. Hence we at once know the Conclusion to be

xy0

that is, in abstract form,

“No x are y”;

that is, in concrete form,

“No gluttons are strong”.]

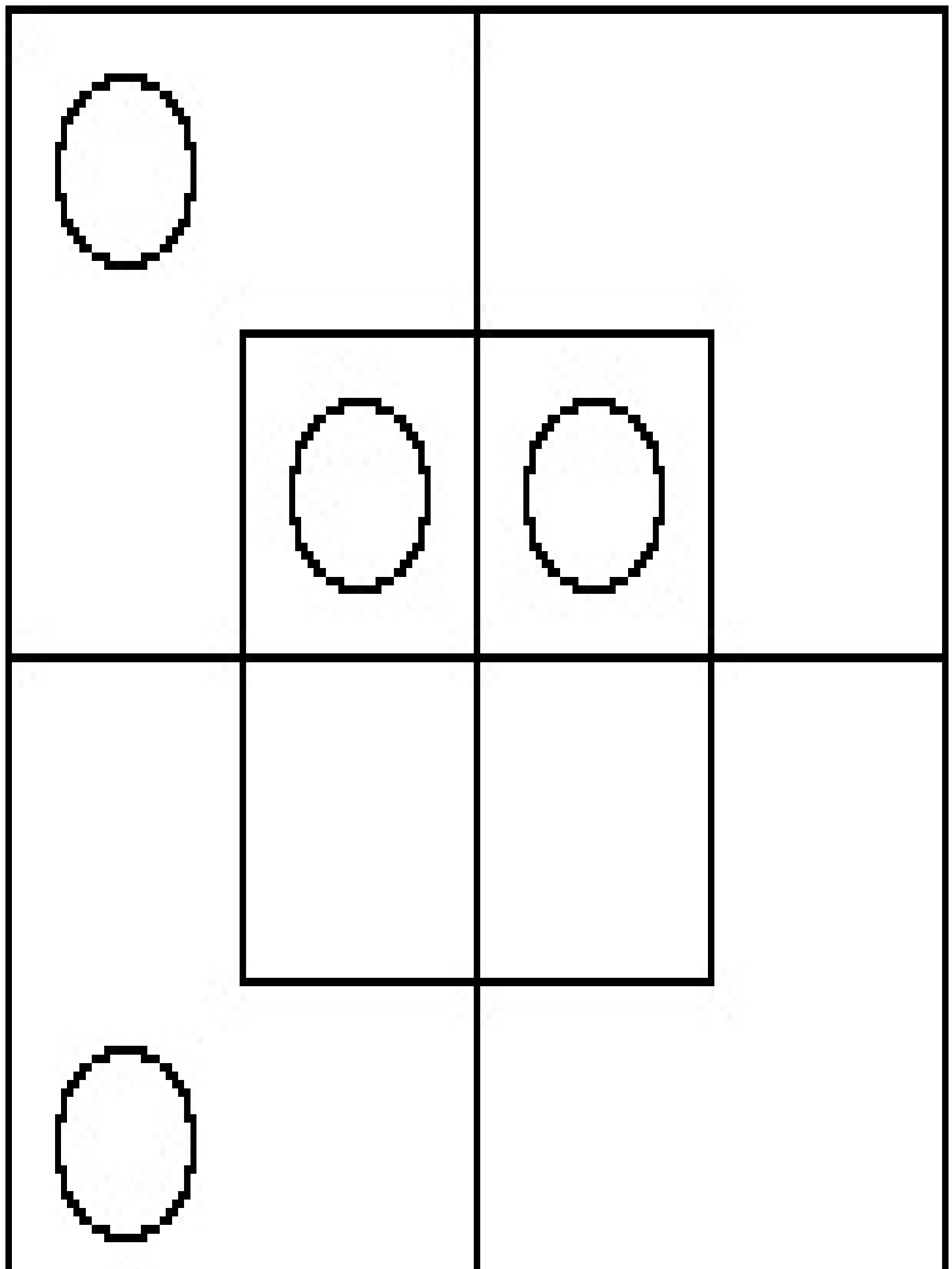
I shall now take three different forms of Pairs of Premisses, and work out their Conclusions, once for all, by Diagrams; and thus obtain some useful Formulæ. I shall call them “Fig. I”, “Fig. II”, and “Fig. III”.

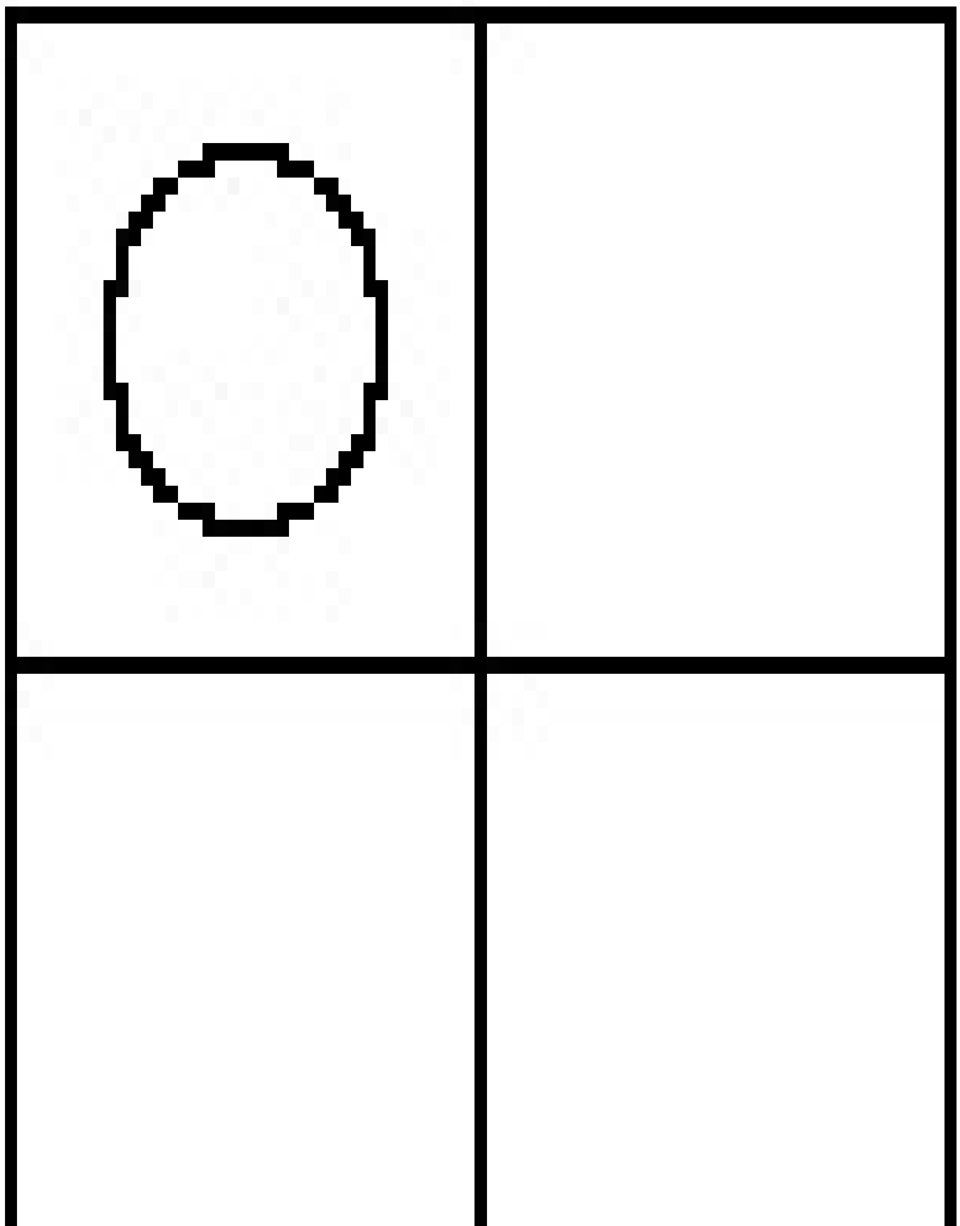
Fig. I.

This includes any Pair of Premisses which are both of them Nullities, and which contain Unlike Eliminands.

The simplest case is

xm0 † ym′0





∴ xy0

In this case we see that the Conclusion is a Nullity, and that the Retinends have kept their Signs.

And we should find this Rule to hold good with any Pair of Premisses which fulfil the given conditions.

[The Reader had better satisfy himself of this, by working out, on Diagrams, several varieties, such as

m1x0 † ym′0 (which ¶ xy0)

xm′0 † m1y0 (which ¶ xy0)

x′m0 † ym′0 (which ¶ x′y0)

m′1x′0 † m1y′0 (which ¶ x′y′0).]

If either Retinend is asserted in the Premisses to exist, of course it may be so asserted in the Conclusion.

Hence we get two Variants of Fig. I, viz.

(α) where one Retinend is so asserted;

(β) where both are so asserted.

[The Reader had better work out, on Diagrams, examples of these two Variants, such as

m1x0 † y1m′0 (which proves y1x0)

x1m′0 † m1y0 (which proves x1y0)

x′1m0 † y1m′0 (which proves x′1y0 † y1x′0).]

The Formula, to be remembered, is

xm0 † ym′0 ¶ xy0

with the following two Rules:—

(1) Two Nullities, with Unlike Eliminands, yield a Nullity, in which both Retinends keep their Signs.

(2) A Retinend, asserted in the Premisses to exist, may be so asserted in the Conclusion.

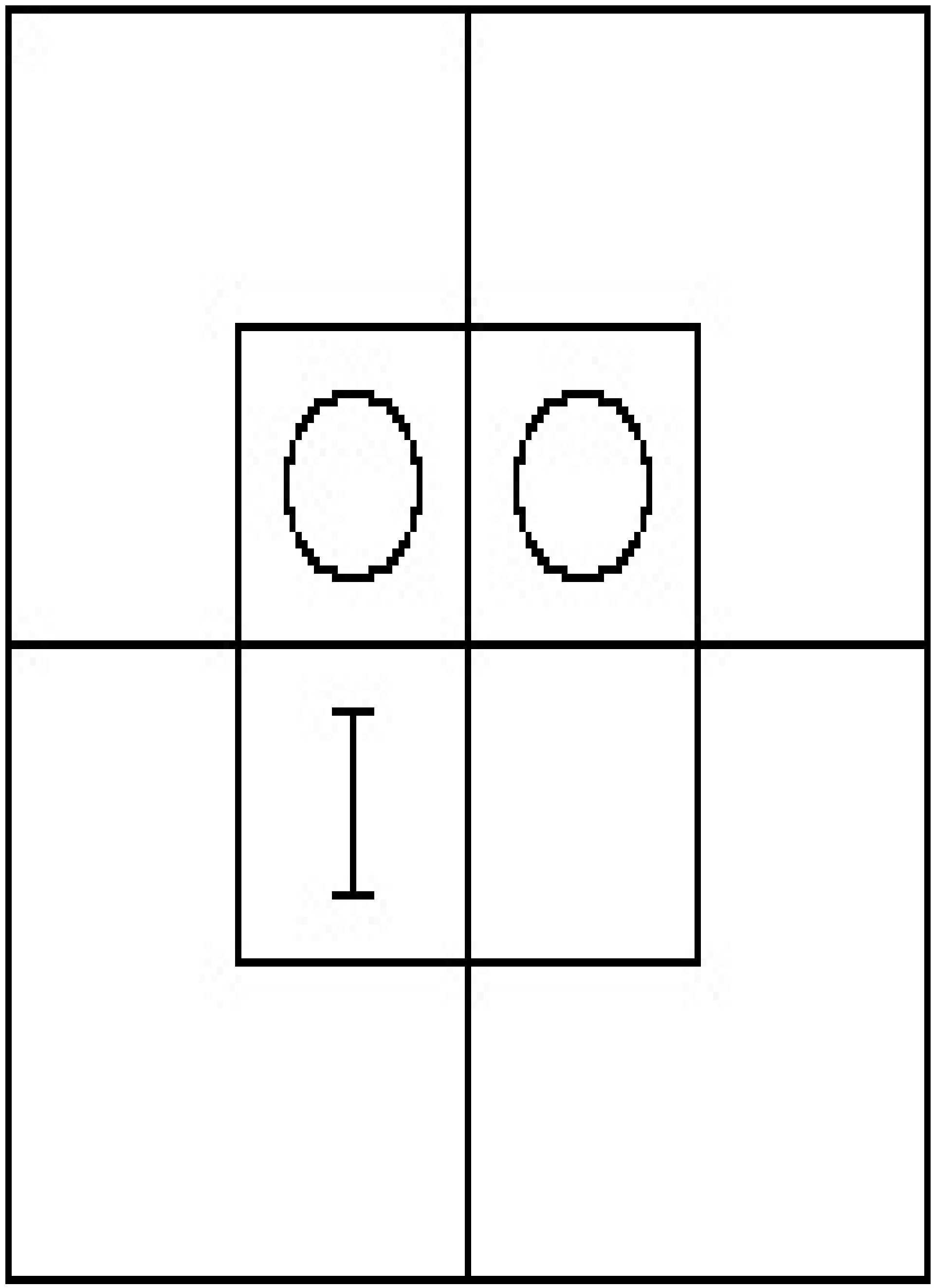
[Note that Rule (1) is merely the Formula expressed in words.]

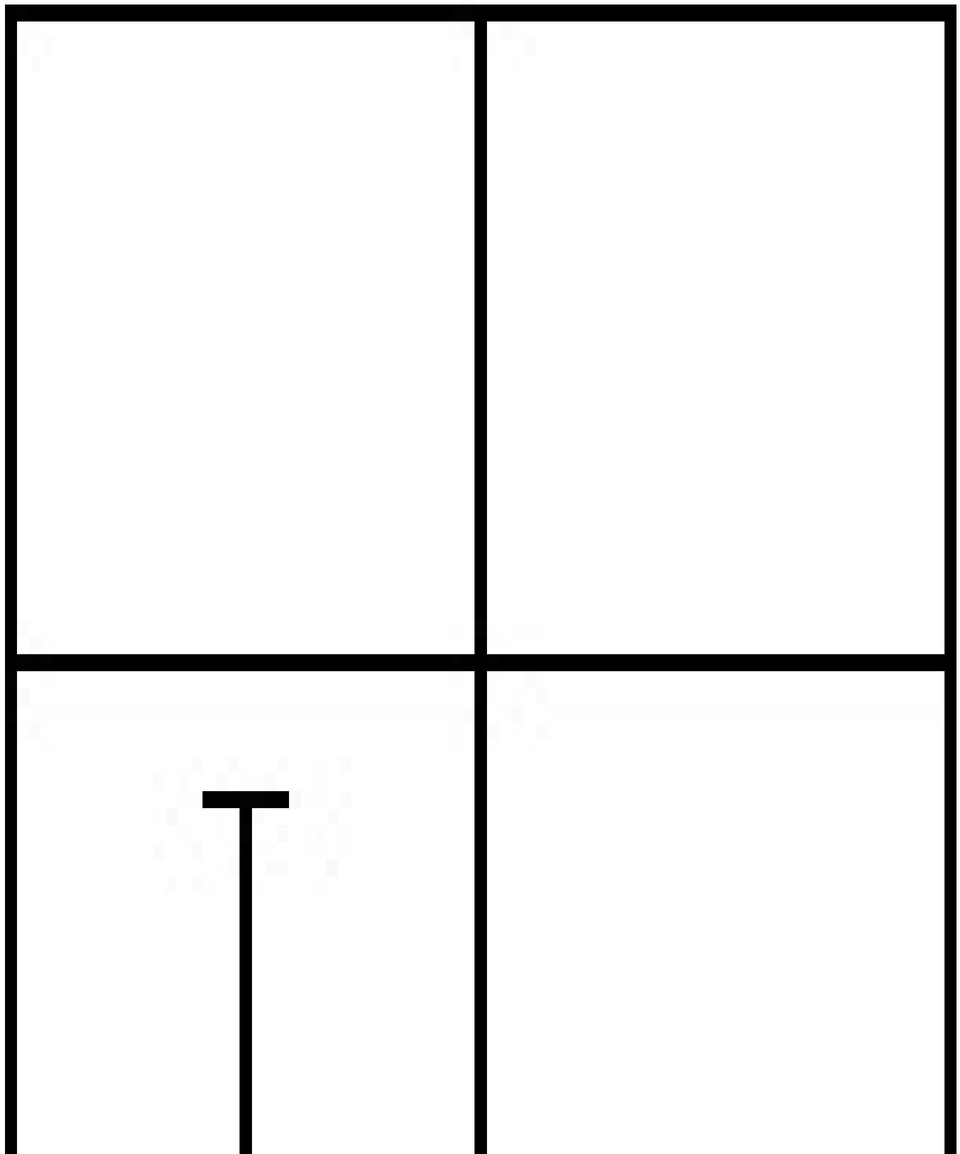
Fig. II.

This includes any Pair of Premisses, of which one is a Nullity and the other an Entity, and which contain Like Eliminands.

The simplest case is

$$xm0 \dagger ym1$$





$$\therefore x'y_1$$

In this case we see that the Conclusion is an Entity, and that the Nullity-Retinend has changed its Sign.

And we should find this Rule to hold good with any Pair of Premisses which fulfil the given conditions.

[The Reader had better satisfy himself of this, by working out, on Diagrams, several varieties, such as

$x'm_0 \dagger ym_1$ (which ¶ xy_1)

$x_1m'_0 \dagger y'm'_1$ (which ¶ $x'y'_1$)

$m_1x_0 \dagger y'm_1$ (which ¶ $x'y'_1$).]

The Formula, to be remembered, is,

$xm_0 \dagger ym_1$ ¶ $x'y_1$

with the following Rule:—

A Nullity and an Entity, with Like Eliminands, yield an Entity, in which the Nullity-Retinend changes its Sign.

[Note that this Rule is merely the Formula expressed in words.]

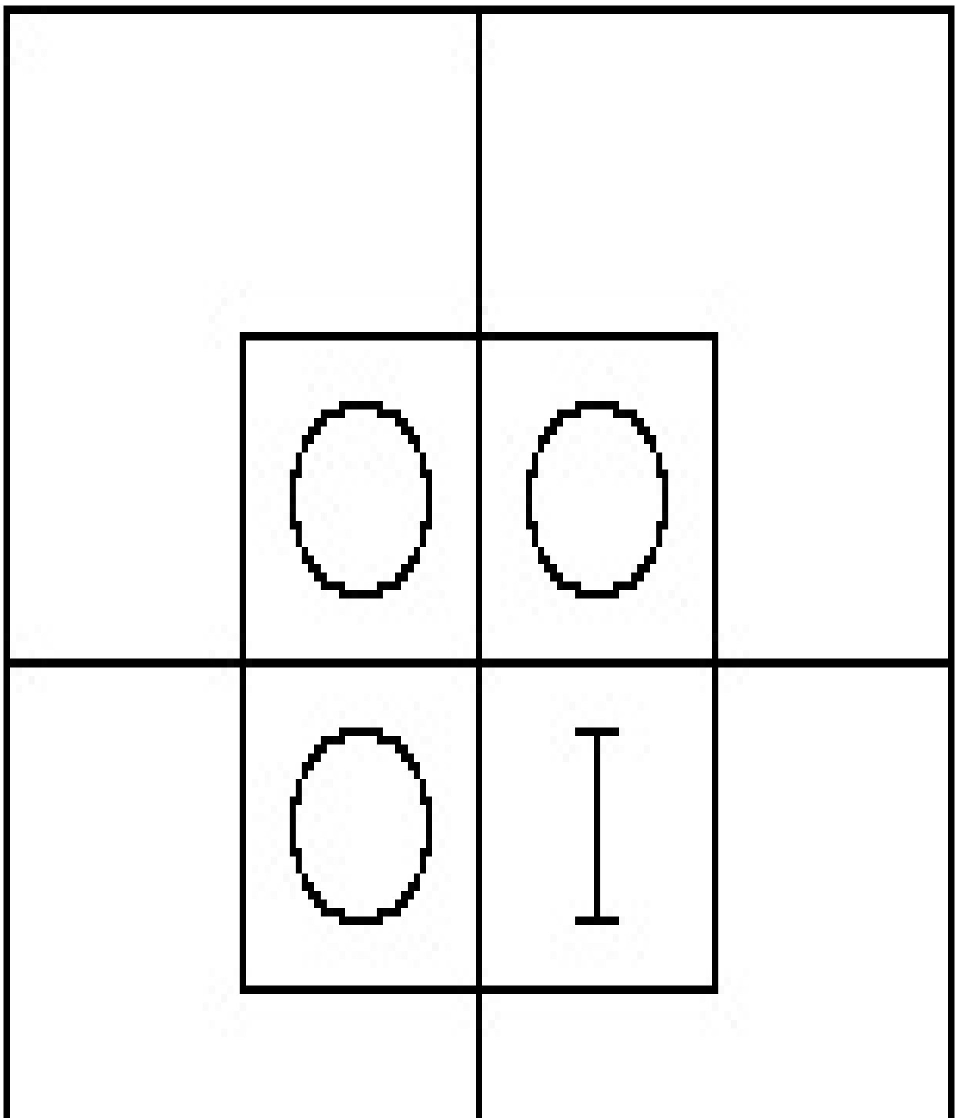
Fig. III.

This includes any Pair of Premisses which are both of them Nullities, and which contain Like Eliminands asserted to exist.

The simplest case is

xm0 † ym0 † m1

[Note that “m1” is here stated separately, because it does not matter in which of the two Premisses it occurs: so that this includes the three forms “m1x0 † ym0”, “xm0 † m1y0”, and “m1x0 † m1y0”.]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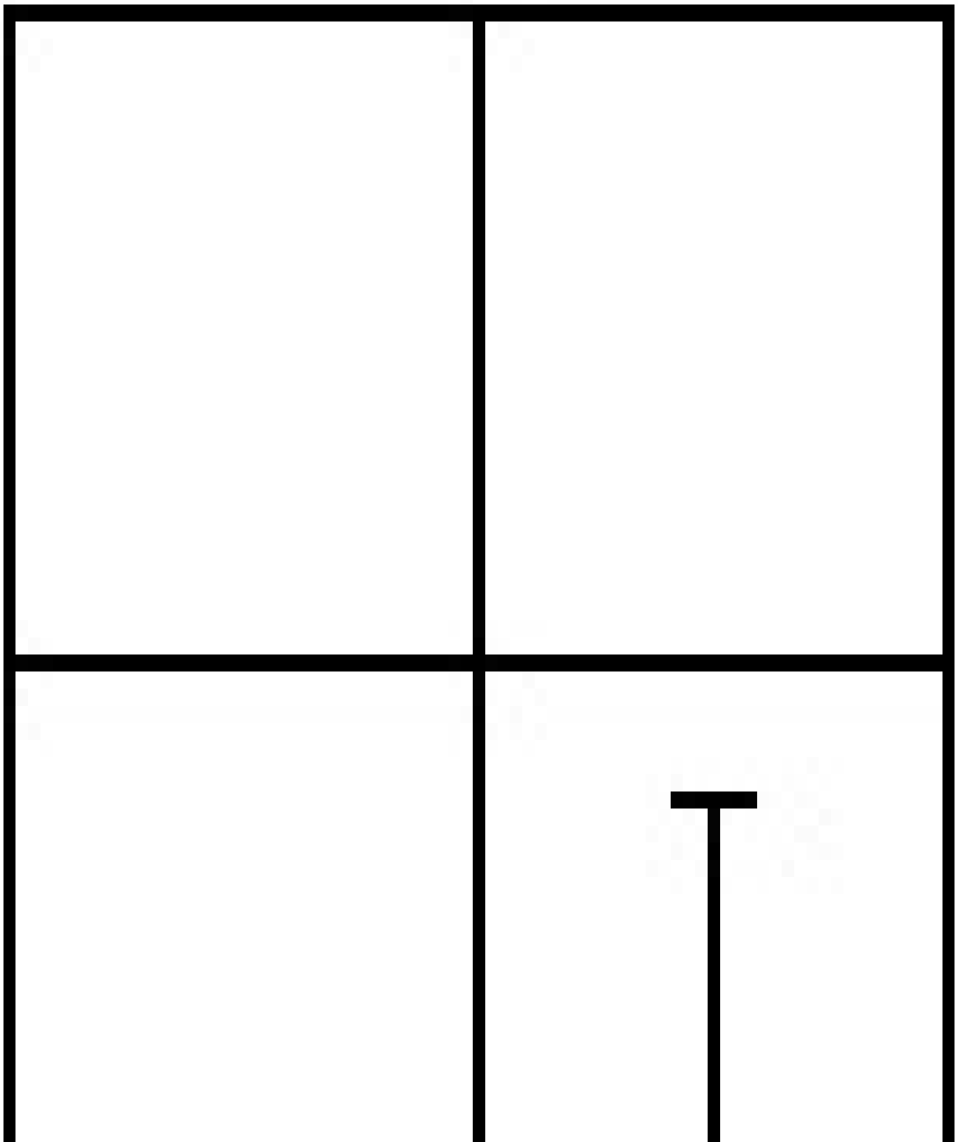


$$\therefore x'y'_1$$

In this case we see that the Conclusion is an Entity, and that both Retinends have changed their Signs.

And we should find this Rule to hold good with any Pair of Premisses which fulfil the given conditions.

[The Reader had better satisfy himself of this, by working out, on Diagrams, several varieties, such as

$x'm_0 \dagger m_1y_0$ (which ¶ xy'_1)

$m'_1x_0 \dagger m'y'_0$ (which ¶ $x'y_1$)

$m_1x'_0 \dagger m_1y'_0$ (which ¶ xy_1).]

The Formula, to be remembered, is

$xm_0 \dagger ym_0 \dagger m_1$ ¶ $x'y'_1$

with the following Rule (which is merely the Formula expressed in words):—

Two Nullities, with Like Eliminands asserted to exist, yield an Entity, in which both Retinends change their Signs.

In order to help the Reader to remember the peculiarities and Formulæ of these three Figures, I will put them all together in one Table.

TABLE IX.

Fig. I.	xm0 † ym′0 ¶ xy0	Two Nullities, with Unlike Eliminands, yield a Nullit
Fig. II.	xm0 † ym1 ¶ x′y1	A Nullity and an Entity, with Like Eliminands, yield
Fig. III.	xm0 † ym0 † m1 ¶ x′y′1	Two Nullities, with Like Eliminands asserted

I will now work out, by these Formulæ, as models for the Reader to imitate, some Problems in Syllogisms which have been already worked, by Diagrams, in Book V., Chap. II.

(1) [see p. 64]

“No son of mine is dishonest;

People always treat an honest man with respect.”

Univ. “men”; m = honest; x = my sons; y = treated with respect.

xm′0 † m1y′0 ¶ xy′0 [Fig. I.

i.e. “No son of mine ever fails to be treated with respect.”

(2) [see p. 64]

“All cats understand French;

Some chickens are cats.”

Univ. “creatures”; m = cats; x = understanding French; y = chickens.

m1x′0 † ym1 ¶ xy1 [Fig. II.

i.e. “Some chickens understand French.”

(3) [see p. 64]

“All diligent students are successful;

All ignorant students are unsuccessful.”

Univ. “students”; m = successful; x = diligent; y = ignorant.

x1m′0 † y1m0 ¶ x1y0 † y1x0 [Fig. I (β).

i.e. “All diligent students are learned; and all ignorant students are idle.”

(4) [see p. 66]

“All soldiers are strong;

All soldiers are brave.

Some strong men are brave.”

Univ. “men”; m = soldiers; x = strong; y = brave.

$m_1x'_0 \dagger m_1y'_0$ ¶ xy_1 [Fig. III.

Hence proposed Conclusion is right.

(5) [see p. 67]

“I admire these pictures;

When I admire anything, I wish to examine it thoroughly.

I wish to examine some of these pictures thoroughly.”

Univ. “things”; m = admired by me; x = these; y = things which I wish to examine thoroughly.

$x_1m'_0 \dagger m_1y'_0$ ¶ $x_1y'_0$ [Fig. I (α).

Hence proposed Conclusion, xy_1, is incomplete, the complete one being “I wish to examine all these pictures thoroughly.”

(6) [see p. 67]

“None but the brave deserve the fair;

Some braggarts are cowards.

Some braggarts do not deserve the fair.”

Univ. “persons”; m = brave; x = deserving of the fair; y = braggarts.

$m'x_0$ † ym'_1 ¶ $x'y_1$ [Fig. II.

Hence proposed Conclusion is right.

(7) [see p. 69]

”No one, who means to go by the train and cannot get a conveyance, and has not enough time to walk to the station, can do without running;

This party of tourists mean to go by the train and cannot get a conveyance, but they have plenty of time to walk to the station.

This party of tourists need not run.”

Univ. “persons meaning to go by the train, and unable to get a conveyance”; m = having enough time to walk to the station; x = needing to run; y = these tourists.

$m'x'_0 \dagger y_1 m'_0$ do not come under any of the three Figures. Hence it is necessary to return to the Method of Diagrams, as shown at p. 69.

Hence there is no Conclusion.

[Work Examples § 4, 12–20 (p. 100); § 5, 13–24 (pp. 101, 102); § 6, 1–6 (p. 106); § 7, 1–3 (pp. 107, 108). Also read Note (A), at p. 164.]

§ 3.

Fallacies.

Any argument which deceives us, by seeming to prove what it does not really prove, may be called a ‘Fallacy’ (derived from the Latin verb fallo “I deceive”): but the particular kind, to be now discussed, consists of a Pair of Propositions, which are proposed as the Premisses of a Syllogism, but yield no Conclusion.

When each of the proposed Premisses is a Proposition in I, or E, or A, (the only kinds with which we are now concerned,) the Fallacy may be detected by the ‘Method of Diagrams,’ by simply setting them out on a Triliteral Diagram, and observing that they yield no information which can be transferred to the Biliteral Diagram.

But suppose we were working by the ‘Method of Subscripts,’ and had to deal with a Pair of proposed Premisses, which happened to be a ‘Fallacy,’ how could we be certain that they would not yield any Conclusion?

Our best plan is, I think, to deal with Fallacies in the same was as we have already dealt with Syllogisms: that is, to take certain forms of Pairs of Propositions, and to work them out, once for all, on the Triliteral Diagram, and ascertain that they yield no Conclusion; and then to record them, for future use, as Formulæ for Fallacies, just as we have already recorded our three Formulæ

for Syllogisms.

Now, if we were to record the two Sets of Formulæ in the same shape, viz. by the Method of Subscripts, there would be considerable risk of confusing the two kinds. Hence, in order to keep them distinct, I propose to record the Formulæ for Fallacies in words, and to call them “Forms” instead of “Formulæ.”

Let us now proceed to find, by the Method of Diagrams, three “Forms of Fallacies,” which we will then put on record for future use. They are as follows:—

(1) Fallacy of Like Eliminands not asserted to exist.

(2) Fallacy of Unlike Eliminands with an Entity-Premiss.

(3) Fallacy of two Entity-Premisses.

These shall be discussed separately, and it will be seen that each fails to yield a Conclusion.

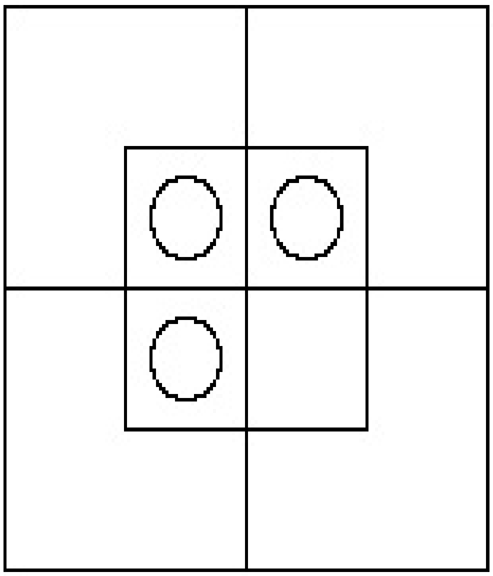
(1) Fallacy of Like Eliminands not asserted to exist.

It is evident that neither of the given Propositions can be an Entity, since that kind asserts the existence of both of its Terms (see p. 20). Hence they must both be Nullities.

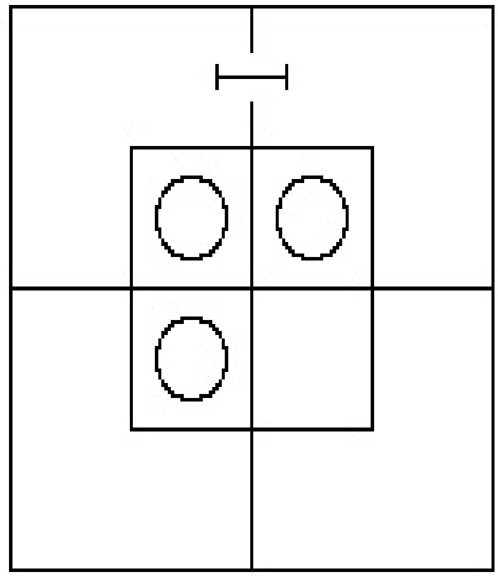
Hence the given Pair may be represented by (xm0 † ym0), with or without x1, y1.

These, set out on Triliteral Diagrams, are

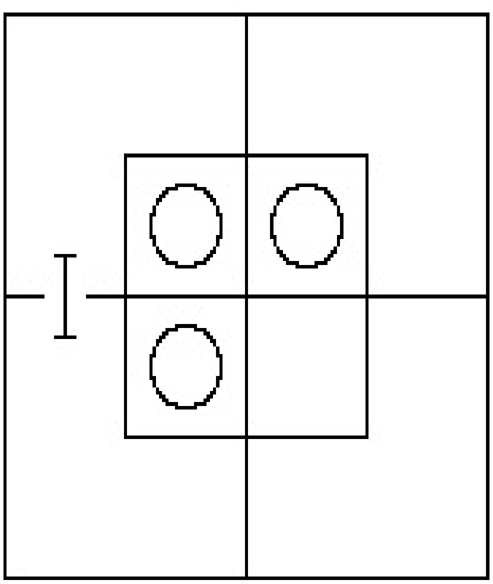
$xm_0 \dagger ym_0$



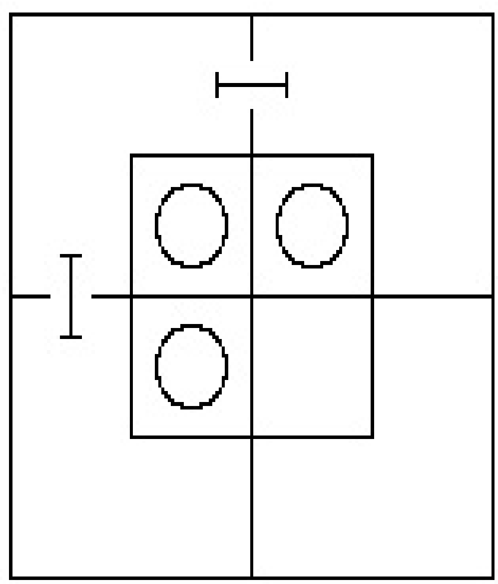
$x_1m_0 \dagger ym_0$



$xm_0 \dagger y_1m_0$



$x_1m_0 \dagger y_1m_0$

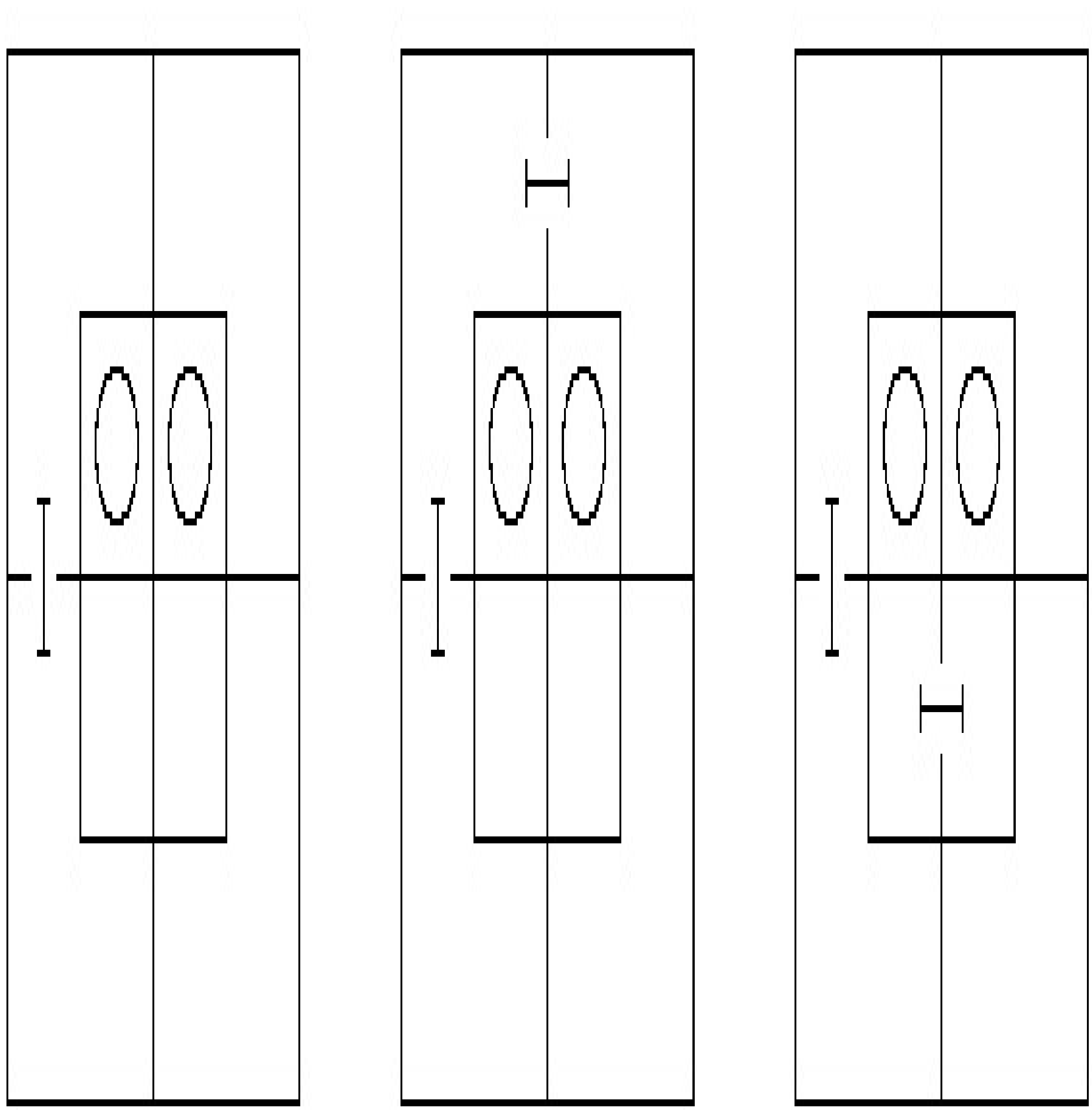


(2) Fallacy of Unlike Eliminands with an Entity-Premiss.

Here the given Pair may be represented by ($xm_0 \dagger ym'_1$) with or without x_1 or m_1.

These, set out on Triliteral Diagrams, are

$xm_0 + ym'_1$ $x_1m_0 + ym'_1$ $m_1x_0 + ym'_1$

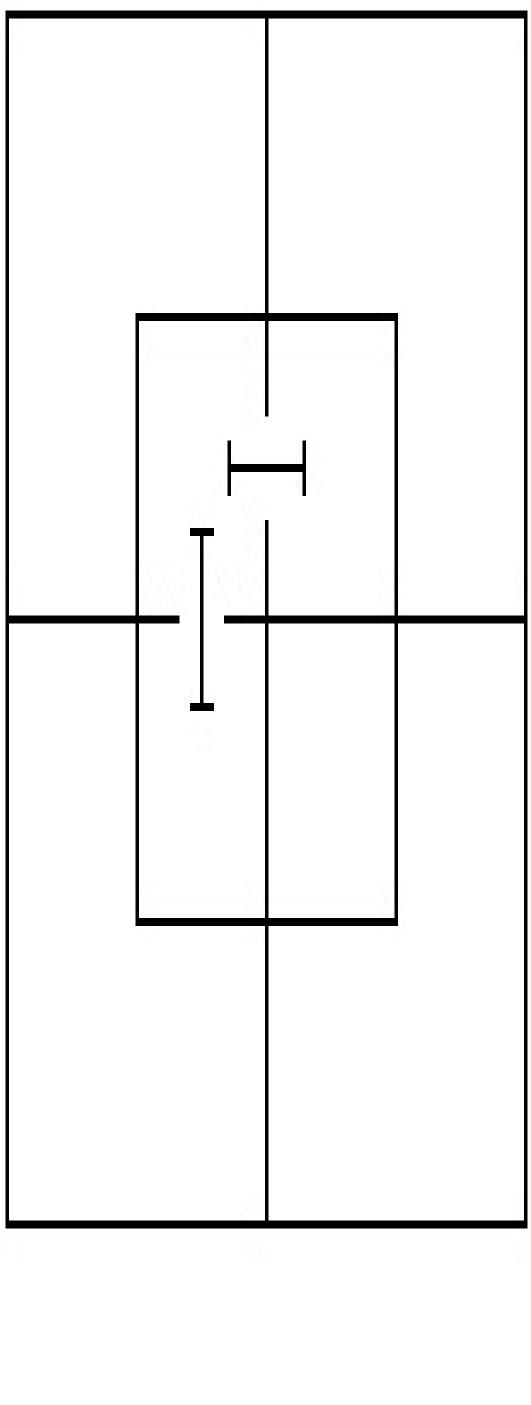


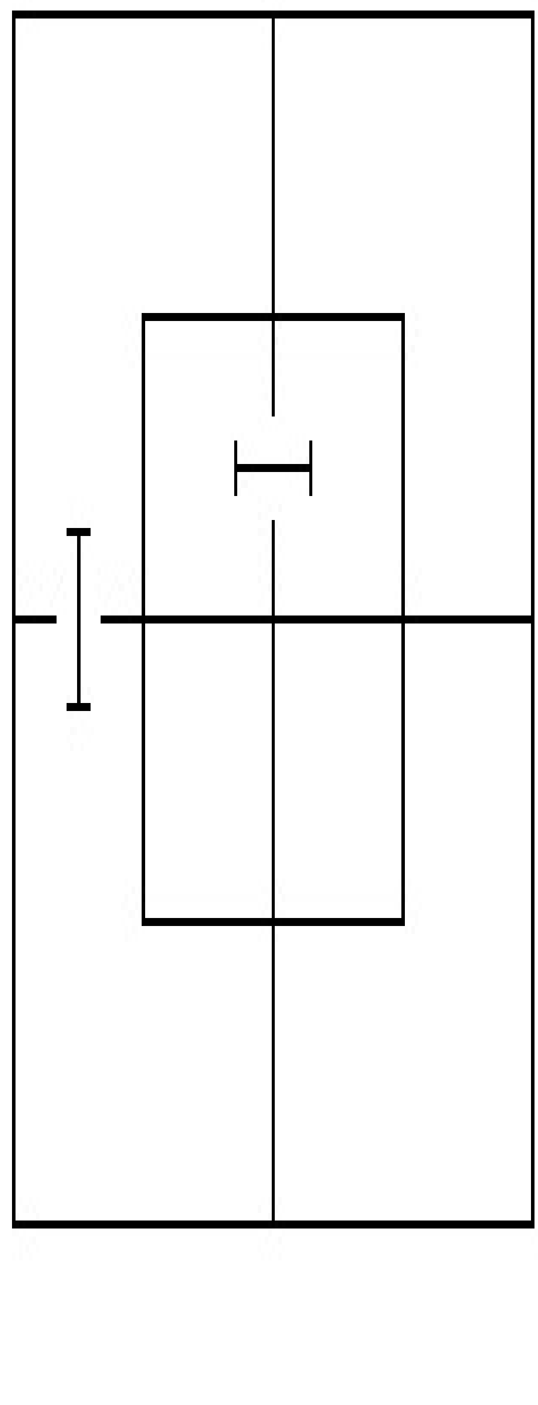
(3) Fallacy of two Entity-Premisses.

Here the given Pair may be represented by either (xm_1 † ym_1) or (xm_1 † ym'_1).

These, set out on Triliteral Diagrams, are

$xm_1 \dagger ym_1$ $xm_1 \dagger ym'_1$





§ 4.

Method of proceeding with a given Pair of Propositions.

Let us suppose that we have before us a Pair of Propositions of Relation, which contain between them a Pair of codivisional Classes, and that we wish to ascertain what Conclusion, if any, is consequent from them. We translate them, if necessary, into subscript-form, and then proceed as follows:—

(1) We examine their Subscripts, in order to see whether they are

(a) a Pair of Nullities;

or (b) a Nullity and an Entity;

or (c) a Pair of Entities.

(2) If they are a Pair of Nullities, we examine their Eliminands, in order to see whether they are Unlike or Like.

If their Eliminands are Unlike, it is a case of Fig. I. We then examine their Retinends, to see whether one or both of them are asserted to exist. If one Retinend is so asserted, it is a case of Fig. I (α); if both, it is a case of Fig. I (β).

If their Eliminands are Like, we examine them, in order to see whether either of them is asserted to exist. If so, it is a case of Fig. III.; if not, it is a case of "Fallacy of Like Eliminands not asserted to exist."

(3) If they are a Nullity and an Entity, we examine their Eliminands, in order to see whether they are Like or Unlike.

If their Eliminands are Like, it is a case of Fig. II.; if Unlike, it is a case of "Fallacy of Unlike Eliminands with an Entity-Premiss."

(4) If they are a Pair of Entities, it is a case of "Fallacy of two Entity-Premisses."

[Work Examples § 4, 1–11 (p. 100); § 5, 1–12 (p. 101); § 6, 7–12 (p. 106); § 7, 7–12 (p. 108).]

BOOK VII.

SORITESES.

CHAPTER I.

INTRODUCTORY.

Table of Contents

When a Set of three or more Biliteral Propositions are such that all their Terms are Species of the same Genus, and are also so related that two of them, taken together, yield a Conclusion, which, taken with another of them, yields another Conclusion, and so on, until all have been taken, it is evident that, if the original Set were true, the last Conclusion would also be true.

Such a Set, with the last Conclusion tacked on, is called a ‘Sorites’; the original Set of Propositions is called its ‘Premisses’; each of the intermediate Conclusions is called a ‘Partial Conclusion’ of the Sorites; the last Conclusion is called its ‘Complete Conclusion,’ or, more briefly, its ‘Conclusion’; the Genus, of which all the Terms are Species, is called its ‘Universe of Discourse’, or, more briefly, its ‘Univ.’; the Terms, used as Eliminands in the Syllogisms, are called its ‘Eliminands’; and the two Terms, which are retained, and therefore appear in the Conclusion, are called its ‘Retinends’.

[Note that each Partial Conclusion contains one or two Eliminands; but that the Complete Conclusion contains Retinends only.]

The Conclusion is said to be ‘consequent’ from the Premisses; for which reason it is usual to prefix to it the word “Therefore” (or the symbol “∴”).

[Note that the question, whether the Conclusion is or is not consequent from the Premisses, is not affected by the actual truth or falsity of any one of the Propositions which make up the Sorites, by depends entirely on their relationship to one another.

As a specimen-Sorites, let us take the following Set of 5 Propositions:—

(1) ”No a are b′;

(2) All b are c;

(3) All c are d;

(4) No e′ are a′;

(5) All h are e′”.

Here the first and second, taken together, yield “No a are c′”.

This, taken along with the third, yields “No a are d′”.

This, taken along with the fourth, yields “No d′ are e′”.

And this, taken along with the fifth, yields “All h are d”.

Hence, if the original Set were true, this would also be true.

Hence the original Set, with this tacked on, is a Sorites; the original Set is its Premisses; the Proposition “All h are d” is its Conclusion; the Terms a, b, c, e are its Eliminands; and the Terms d and h are its Retinends.

Hence we may write the whole Sorites thus:—

”No a are b′;

All b are c;

All c are d;

No e′ are a′;

All h are e′.

∴ All h are d”.

In the above Sorites, the 3 Partial Conclusions are the Positions “No a are e′”, “No a are d′”, “No d′ are e′”; but, if the Premisses were arranged in other ways, other Partial Conclusions might be obtained. Thus, the order 41523 yields the Partial Conclusions “No c′ are b′”, “All h are b”, “All h are c”. There are altogether nine Partial Conclusions to this Sorites, which the Reader will find it an interesting task to make out for himself.]

CHAPTER II.

PROBLEMS IN SORITESES.

Table of Contents

§ 1.

Introductory.

The Problems we shall have to solve are of the following form:—

“Given three or more Propositions of Relation, which are proposed as Premisses: to ascertain what Conclusion, if any, is consequent from them.”

We will limit ourselves, at present, to Problems which can be worked by the Formulæ of Fig. I. (See p. 75.) Those, that require other Formulæ, are rather too hard for beginners.

Such Problems may be solved by either of two Methods, viz.

(1) The Method of Separate Syllogisms;

(2) The Method of Underscoring.

These shall be discussed separately.

§ 2.

Solution by Method of Separate Syllogisms.

The Rules, for doing this, are as follows:—

(1) Name the ‘Universe of Discourse’.

(2) Construct a Dictionary, making a, b, c, &c. represent the Terms.

(3) Put the Proposed Premisses into subscript form.

(4) Select two which, containing between them a pair of codivisional Classes, can be used as the Premisses of a Syllogism.

(5) Find their Conclusion by Formula.

(6) Find a third Premiss which, along with this Conclusion, can be used as the Premisses of a second Syllogism.

(7) Find a second Conclusion by Formula.

(8) Proceed thus, until all the proposed Premisses have been used.

(9) Put the last Conclusion, which is the Complete Conclusion of the Sorites, into concrete form.

[As an example of this process, let us take, as the proposed Set of Premisses,

(1) “All the policemen on this beat sup with our cook;

(2) No man with long hair can fail to be a poet;

(3) Amos Judd has never been in prison;

(4) Our cook’s ‘cousins’ all love cold mutton;

(5) None but policemen on this beat are poets;

(6) None but her ‘cousins’ ever sup with our cook;

(7) Men with short hair have all been in prison.”

Univ. “men”; a = Amos Judd; b = cousins of our cook; c = having been in prison; d = long-haired; e = loving cold mutton; h = poets; k = policemen on this beat; l = supping with our cook

We now have to put the proposed Premisses into subscript form. Let us begin by putting them into abstract form. The result is

(1) ”All k are l;

(2) No d are h′;

(3) All a are c′;

(4) All b are e;

(5) No k′ are h;

(6) No b′ are l;

(7) All d′ are c.”

And it is now easy to put them into subscript form, as follows:—

(1) $k_1 l'_0$

(2) dh'_0

(3) $a_1 c_0$

(4) $b_1 e'_0$

(5) $k'h_0$

(6) $b'l_0$

(7) $d'_1 c'_0$

We now have to find a pair of Premisses which will yield a Conclusion. Let us begin with No. (1), and look down the list, till we come to one which we can take along with it, so as to form Premisses belonging to Fig. I. We find that No. (5) will do, since we can take k as our Eliminand. So our first syllogism is

(1) $k_1 l'_0$

(5) $k'h_0$

$\therefore l'h_0$ … (8)

We must now begin again with $l'h_0$ and find a Premiss to go along with it. We find that No. (2) will do, h being our Eliminand. So our next Syllogism is

(8) l′h0

(2) dh′0

∴ l′d0 … (9)

We have now used up Nos. (1), (5), and (2), and must search among the others for a partner for l′d0. We find that No. (6) will do. So we write

(9) l′d0

(6) b′l0

∴ db′0 … (10)

Now what can we take along with db′0? No. (4) will do.

(10) db′0

(4) b1e′0

∴ de′0 … (11)

Along with this we may take No. (7).

(11) de′0

(7) d′1c′0

$\therefore$ c′e′0 … (12)

And along with this we may take No. (3).

(12) c′e′0

(3) a1c0

$\therefore$ a1e′0

This Complete Conclusion, translated into abstract form, is

“All a are e”;

and this, translated into concrete form, is

“Amos Judd loves cold mutton.”

In actually working this Problem, the above explanations would, of course, be omitted, and all, that would appear on paper, would be as follows:—

(1) k1l′0

(2) dh′0

(3) a1c0

(4) b1e′0

(5) k′h0

(6) b′l0

(7) d′1c′0

(1) k1l′0

(5) k′h0

∴ l′h0 … (8)

(8) l′h0

(2) dh′0

∴ l′d0 … (9)

(9) l′d0

(6) b′l0

∴ db′0 … (10)

(10) db′0

(4) b1e′0

∴ de′0 … (11)

(11) de′0

(7) d′1c′0

∴ c′e′0 … (12)

(12) c′e′0

(3) a1c0

∴ a1e′0

Note that, in working a Sorites by this Process, we may begin with any Premiss we choose.]

§ 3.

Solution by Method of Underscoring.

Consider the Pair of Premisses

xm0 † ym′0

which yield the Conclusion xy0

We see that, in order to get this Conclusion, we must eliminate m and m′, and write x and y together in one expression.

Now, if we agree to mark m and m′ as eliminated, and to read the two expressions together, as if they were written in one, the two Premisses will then exactly represent the Conclusion, and we need not write it out separately.

Let us agree to mark the eliminated letters by underscoring them, putting a single score under the first, and a double one under the second.

The two Premisses now become

$$xx_{-0} \dagger fxx'_{=0}$$

which we read as “xy0”.

In copying out the Premisses for underscoring, it will be convenient to omit all subscripts. As to the “0’s” we may always suppose them written, and, as to the “1’s”, we are not concerned to know which Terms are asserted to exist, except those which appear in the Complete Conclusion; and for them it will be easy enough to refer to the original list.

[I will now go through the process of solving, by this method, the example worked in § 2.

The Data are

1 2 3 4 5 6 7

k, l'_{10} † $a l_{0}$ † a, c_{10} † b, e_{10} † k, h_{0} † b, l_{0} † a, c_{10}

The Reader should take a piece of paper, and write out this solution for himself. The first line will consist of the above Data; the second must be composed, bit by bit, according to the following directions.

We begin by writing down the first Premiss, with its numeral over it, but omitting the subscripts.

We have now to find a Premiss which can be combined with this, i.e., a Premiss containing either k′ or l. The first we find is No. 5; and this we tack on, with a †.

To get the Conclusion from these, k and k′ must be eliminated, and what remains must be taken as one expression. So we underscore them, putting a single score under k, and a double one under k′. The result we read as l′h.

We must now find a Premiss containing either l or h′. Looking along the row, we fix on No. 2, and tack it on.

Now these 3 Nullities are really equivalent to (l′h † dh′), in which h and h′ must be eliminated, and what remains taken as one expression. So we underscore them. The result reads as l′d.

We now want a Premiss containing l or d′. No. 6 will do.

These 4 Nullities are really equivalent to (l′d † b′l). So we underscore l′ and l. The result reads as db′.

We now want a Premiss containing d′ or b. No. 4 will do.

Here we underscore b′ and b. The result reads as de′.

We now want a Premiss containing d′ or e. No. 7 will do.

Here we underscore d and d′. The result reads as c′e′.

We now want a Premiss containing c or e. No. 3 will do—in fact must do, as it is the only one left.

Here we underscore c′ and c; and, as the whole thing now reads as e′a, we tack

on e′a0 as the Conclusion, with a ¶.

We now look along the row of Data, to see whether e′ or a has been given as existent. We find that a has been so given in No. 3. So we add this fact to the Conclusion, which now stands as ¶ e′a0 † a1, i.e. ¶ a1e′0; i.e. “All a are e.”

If the Reader has faithfully obeyed the above directions, his written solution will now stand as follows:—

$$\begin{array}{ccccccc} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ k_1 l'_0 + & d h'_0 + & a_1 c_0 + & b_1 e'_0 + & k' h_0 + & b' l_0 + & d'_1 c'_0 \end{array}$$

$$\begin{array}{ccccccc} 1 & 5 & 2 & 6 & 4 & 7 & 3 \\ kl' + & k'h + & dh' + & bl' + & be' + & d'c' + & ac \end{array}$$

¶ $e'a_0 + a_1$ i.e. ¶ $a_1 e'_0$;

i.e. “All a are e.”

The Reader should now take a second piece of paper, and copy the Data only, and try to work out the solution for himself, beginning with some other Premiss.

If he fails to bring out the Conclusion $a_1e'_0$, I would advise him to take a third piece of paper, and begin again!]

I will now work out, in its briefest form, a Sorites of 5 Premisses, to serve as a model for the Reader to imitate in working examples.

(1) ”I greatly value everything that John gives me;

(2) Nothing but this bone will satisfy my dog;

(3) I take particular care of everything that I greatly value;

(4) This bone was a present from John;

(5) The things, of which I take particular care, are things I do not give to my dog”.

Univ. “things”; a = given by John to me; b = given by me to my dog; c = greatly valued by me; d = satisfactory to my dog; e = taken particular care of by me; h = this bone.

$$\begin{array}{ccccccccc} 1 & & 2 & & 3 & & 4 & & 5 \\ a_1 c'_0 & + & h' d_0 & + & c_1 e'_0 & + & h_1 a'_0 & + & e_1 b_0 \end{array}$$

$$\begin{array}{ccccccccc} 1 & & 3 & & 4 & & 2 & & 5 \\ \underline{ac'} & + & \underline{ce'} & + & \underline{ha'} & + & \underline{h'd} & + & \underline{eb} \end{array} \quad \P\, db_0$$

i.e. “Nothing, that I give my dog, satisfies him,” or, “My dog is not satisfied with anything that I give him!”

[Note that, in working a Sorites by this process, we may begin with any Premiss we choose. For instance, we might begin with No. 5, and the result would then be

5 3 1 4 2

$eb + ce + ac + ba + kd$ (bag)

[Work Examples § 4, 25–30 (p. 100); § 5, 25–30 (p. 102); § 6, 13–15 (p. 106); § 7, 13–15 (p. 108); § 8, 1–4, 13, 14, 19, 24 (pp. 110, 111); § 9, 1–4, 26, 27, 40, 48 (pp. 112, 116, 119, 121).]

I. § 4, 31 (p. 100); § 5, 31–34 (p. 102); § 6, 16, 17 (p. 106); § 7, 16 (p. 108); § 8, 5, 6 (p. 110); § 9, 5, 22, 42 (pp. 112, 115, 119). What is ‘Classification’? And what is a ‘Class’?

II. § 4, 32 (p. 100); § 5, 35–38 (pp. 102, 103); § 6, 18 (p. 107); § 7, 17, 18 (p. 108); § 8, 7, 8 (p. 110); § 9, 6, 23, 43 (pp. 112, 115, 119). What are ‘Genus’, ‘Species’, and ‘Differentia’?

III. § 4, 33 (p. 100); § 5, 39–42 (p. 103); § 6, 19, 20 (p. 107); § 7, 19 (p. 109); § 8, 9, 10 (p. 111); § 9, 7, 24, 44 (pp. 113, 116, 120). What are ‘Real’ and ‘Imaginary’ Classes?

IV. § 4, 34 (p. 100); § 5, 43–46 (p. 103); § 6, 21 (p. 107); § 7, 20, 21 (p. 109); § 8, 11, 12 (p. 111); § 9, 8, 25, 45 (pp. 113, 116, 120). What is ‘Division’? When are Classes said to be ‘Codivisional’?

V. § 4, 35 (p. 100); § 5, 47–50 (p. 103); § 6, 22, 23 (p. 107); § 7, 22 (p. 109); § 8, 15, 16 (p. 111); § 9, 9, 28, 46 (pp. 113, 116, 120). What is ‘Dichotomy’? What arbitrary rule does it sometimes require?

VI. § 4, 36 (p. 100); § 5, 51–54 (p. 103); § 6, 24 (p. 107); § 7, 23, 24 (p. 109); § 8, 17 (p. 111); § 9, 10, 29, 47 (pp. 113, 117, 120). What is a ‘Definition’?

VII. § 4, 37 (p. 100); § 5, 55–58 (pp. 103, 104); § 6, 25, 26 (p. 107); § 7, 25 (p. 109); § 8, 18 (p. 111); § 9, 11, 30, 49 (pp. 113, 117, 121). What are the ‘Subject’ and the ‘Predicate’ of a Proposition? What is its ‘Normal’ form?

VIII. § 4, 38 (p. 100); § 5, 59–62 (p. 104); § 6, 27 (p. 107); § 7, 26, 27 (p. 109); § 8, 20 (p. 111); § 9, 12, 31, 50 (pp. 113, 117, 121). What is a Proposition ‘in I’? ‘In E’? And ‘in A’?

IX. § 4, 39 (p. 100); § 5, 63–66 (p. 104); § 6, 28, 29 (p. 107); § 7, 28 (p. 109); § 8, 21 (p. 111); § 9, 13, 32, 51 (pp. 114, 117, 121). What is the ‘Normal’ form of a Proposition of Existence?

X. § 4, 40 (p. 100); § 5, 67–70 (p. 104); § 6, 30 (p. 107); § 7, 29, 30 (p. 109); § 8, 22 (p. 111); § 9, 14, 33, 52 (pp. 114, 117, 122). What is the ‘Universe of Discourse’?

XI. § 4, 41 (p. 100); § 5, 71–74 (p. 104); § 6, 31, 32 (p. 107); § 7, 31 (p. 109); § 8, 23 (p. 111); § 9, 15, 34, 53 (pp. 114, 118, 122). What is implied, in a Proposition of Relation, as to the Reality of its Terms?

XII. § 4, 42 (p. 100); § 5, 75–78 (p. 105); § 6, 33 (p. 107); § 7, 32, 33 (pp. 109, 110); § 8, 25 (p. 111); § 9, 16, 35, 54 (pp. 114, 118, 122). Explain the phrase “sitting on the fence”.

XIII. § 5, 79–83 (p. 105); § 6, 34, 35 (p. 107); § 7, 34 (p. 110); § 8, 26 (p. 111); § 9, 17, 36, 55 (pp. 114, 118, 122). What are ‘Converse’ Propositions?

XIV. § 5, 84–88 (p. 105); § 6, 36 (p. 107); § 7, 35, 36 (p. 110); § 8, 27 (p. 111); § 9, 18, 37, 56 (pp. 114, 118, 123). What are ‘Concrete’ and ‘Abstract’ Propositions?

XV. § 5, 89–93 (p. 105); § 6, 37, 38 (p. 107); § 7, 37 (p. 110); § 8, 28 (p. 111); § 9, 19, 38, 57 (pp. 115, 118, 123). What is a ‘Syllogism’? And what are its ‘Premisses’ and its ‘Conclusion’?

XVI. § 5, 94–97 (p. 106); § 6, 39 (p. 107); § 7, 38, 39 (p. 110); § 8, 29 (p. 111); § 9, 20, 39, 58 (pp. 115, 119, 123). What is a ‘Sorites’? And what are its ‘Premisses’, its ‘Partial Conclusions’, and its ‘Complete Conclusion’?

XVII. § 5, 98–101 (p. 106); § 6, 40 (p. 107); § 7, 40 (p. 110); § 8, 30 (p. 111); § 9, 21, 41, 59, 60 (pp. 115, 119, 124). What are the ‘Universe of Discourse’, the ‘Eliminands’, and the ‘Retinends’, of a Syllogism? And of a Sorites?

BOOK VIII.

EXAMPLES, ANSWERS, AND SOLUTIONS.

[N.B. Reference tags for Examples, Answers & Solutions will be found in the right margin.]

CHAPTER I.

EXAMPLES.

Table of Contents

EX1

§ 1.

Propositions of Relation, to be reduced to normal form.

1. I have been out for a walk.

2. I am feeling better.

3. No one has read the letter but John.

4. Neither you nor I are old.

5. No fat creatures run well.

6. None but the brave deserve the fair.

7. No one looks poetical unless he is pale.

8. Some judges lose their tempers.

9. I never neglect important business.

10. What is difficult needs attention.

11. What is unwholesome should be avoided.

12. All the laws passed last week relate to excise.

13. Logic puzzles me.

14. There are no Jews in the house.

15. Some dishes are unwholesome if not well-cooked.

16. Unexciting books make one drowsy.

17. When a man knows what he’s about, he can detect a sharper.

18. You and I know what we’re about.

19. Some bald people wear wigs.

20. Those who are fully occupied never talk about their grievances.

21. No riddles interest me if they can be solved.

EX2

§ 2.

Pairs of Abstract Propositions, one in terms of x and m, and the other in terms of y and m, to be represented on the same Triliteral Diagram.

1. No x are m;

No m′ are y.

2. No x′ are m′;

All m′ are y.

3. Some x′ are m;

No m are y.

4. All m are x;

All m′ are y′.

5. All m′ are x;

All m′ are y′.

6. All x′ are m′;

No y′ are m.

7. All x are m;

All y′ are m′.

8. Some m′ are x′;

No m are y.

9. All m are x′;

No m are y.

10. No m are x′;

No y are m′.

11. No x′ are m′;

No m are y.

12. Some x are m;

All y′ are m.

13. All x′ are m;

No m are y.

14. Some x are m′;

All m are y.

15. No m′ are x′;

All y are m.

16. All x are m′;

No y are m.

17. Some m′ are x;

No m′ are y′.

18. All x are m′;

Some m′ are y′.

19. All m are x;

Some m are y′.

20. No x′ are m;

Some y are m.

21. Some x′ are m′;

All y′ are m.

22. No m are x;

Some m are y.

23. No m′ are x;

All y are m′.

24. All m are x;

No y′ are m′.

25. Some m are x;

No y′ are m.

26. All m′ are x′;

Some y are m′.

27. Some m are x′;

No y′ are m′.

28. No x are m′;

All m are y′.

29. No x′ are m;

No m are y′.

30. No x are m;

Some y′ are m′.

31. Some m′ are x;

All y′ are m;

32. All x are m′;

All y are m.

EX3

§ 3.

Marked Triliteral Diagrams, to be interpreted in terms of x and y.

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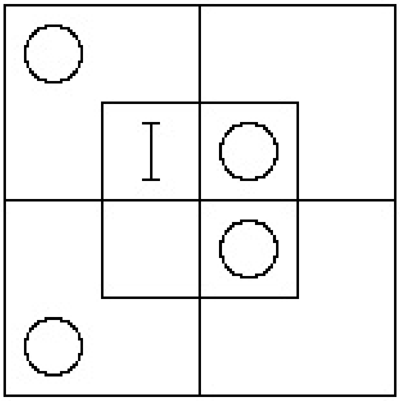

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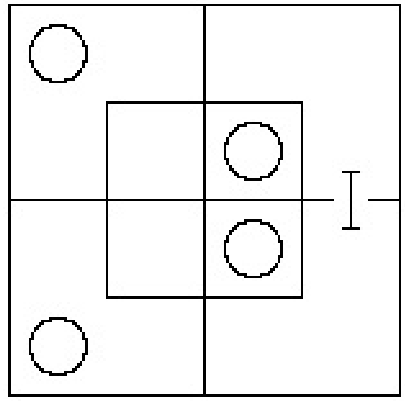

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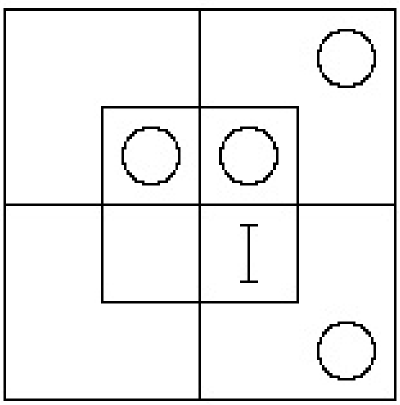

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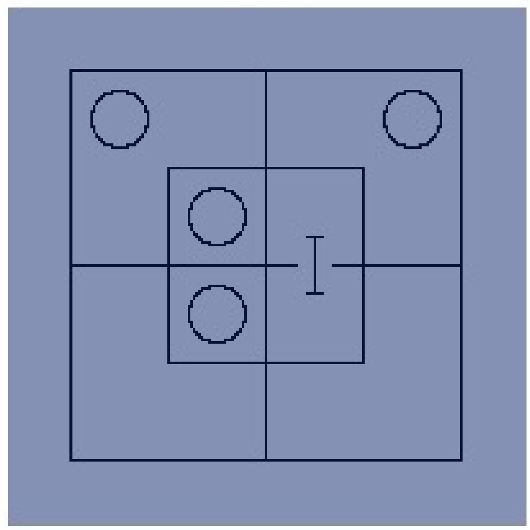

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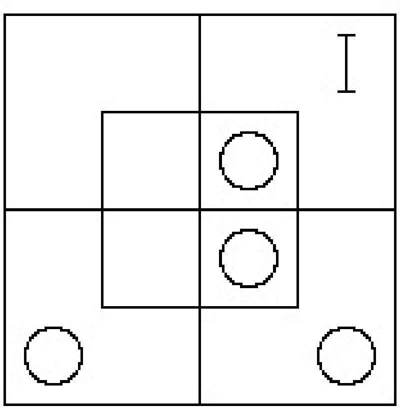

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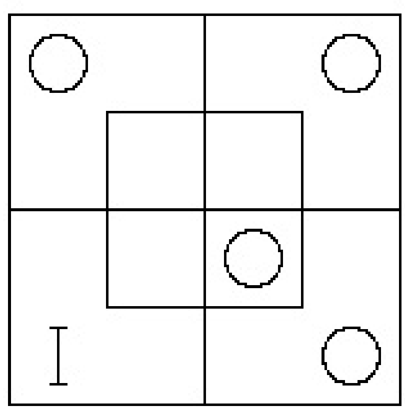

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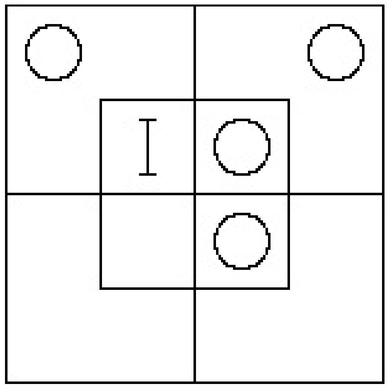

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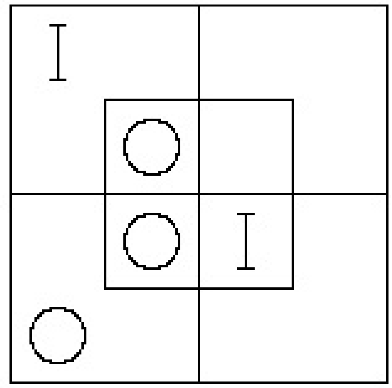

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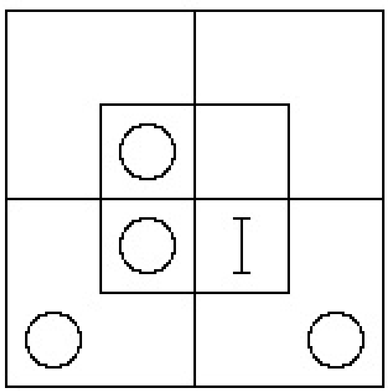

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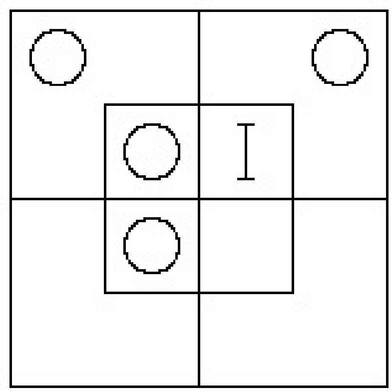

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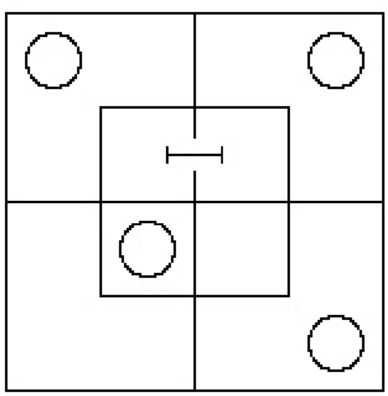

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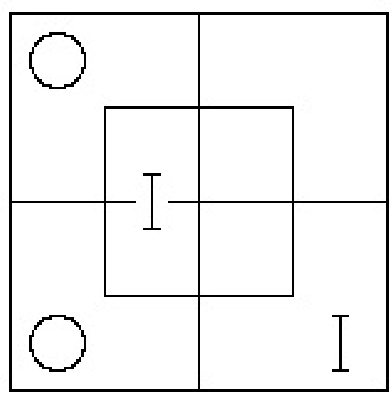

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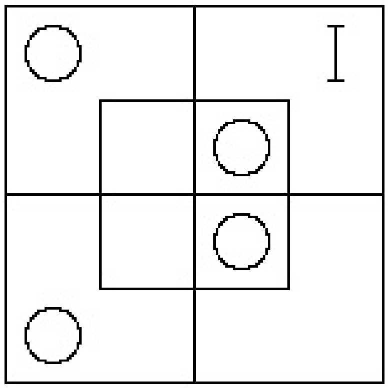

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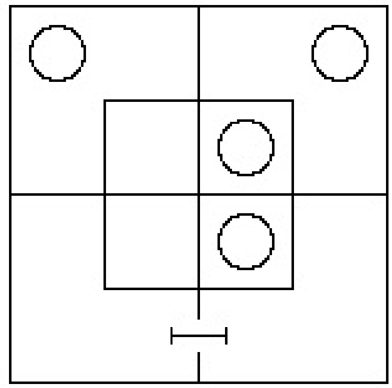

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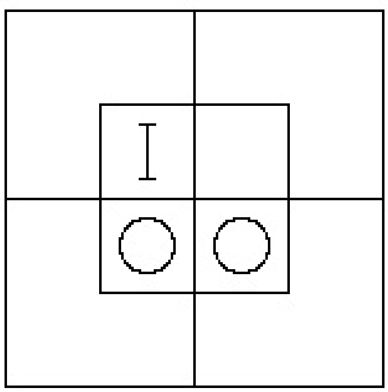

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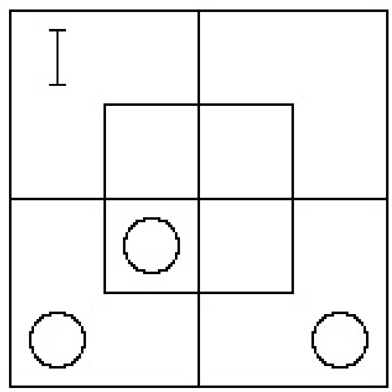

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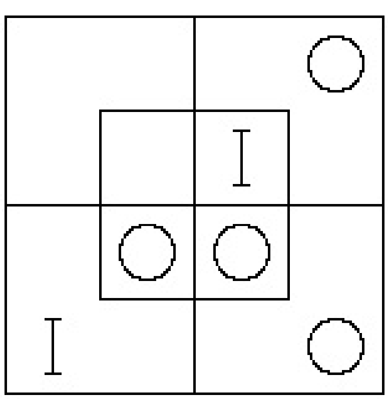

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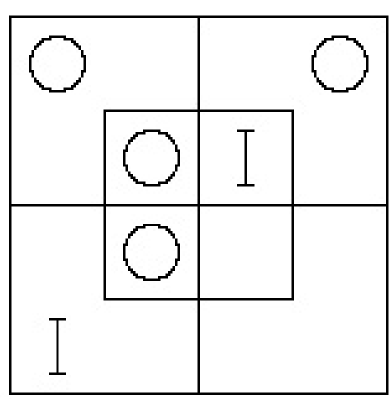

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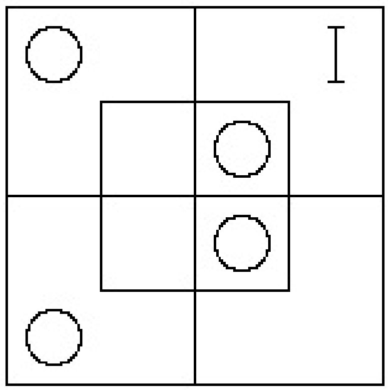

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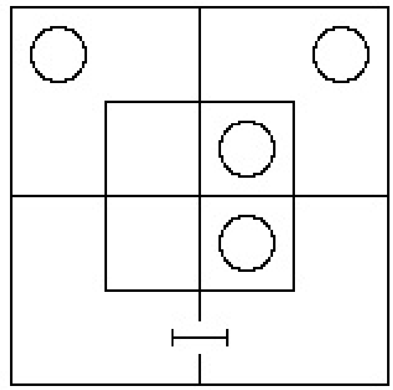

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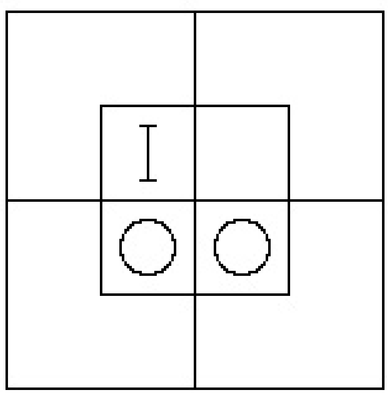

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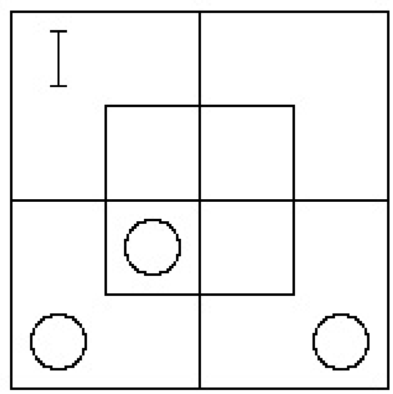

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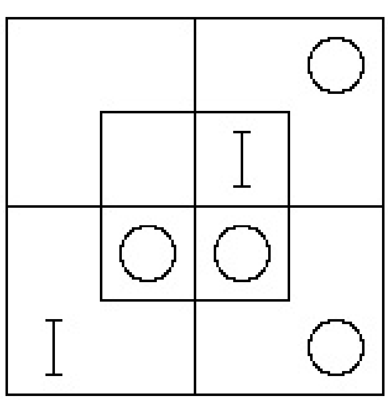

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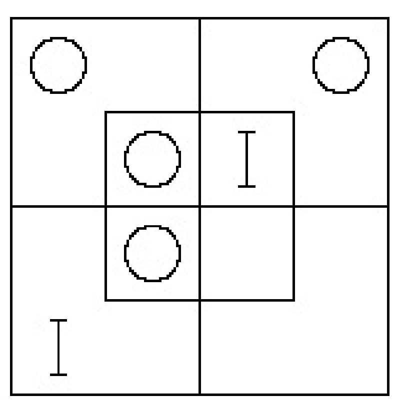

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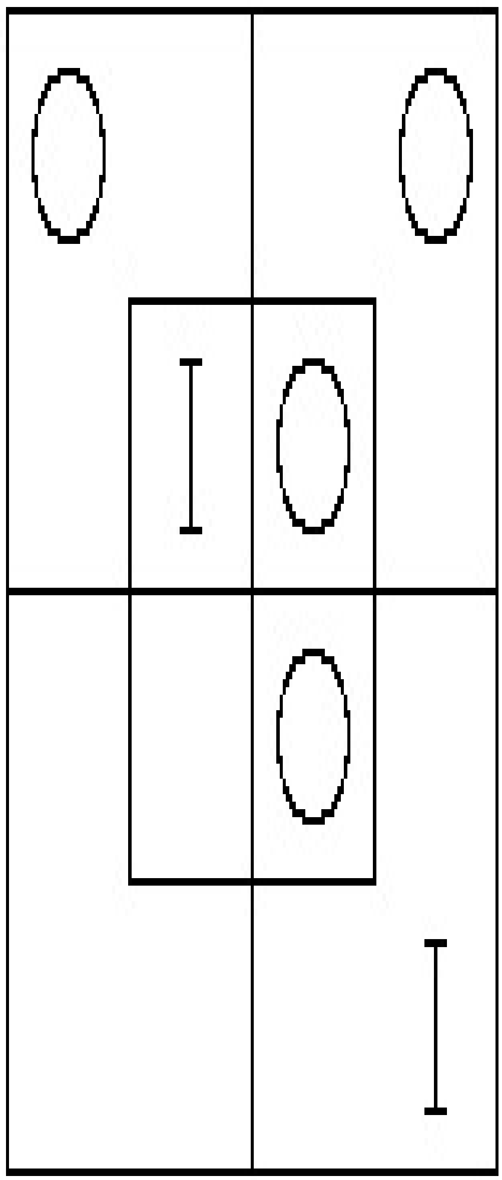

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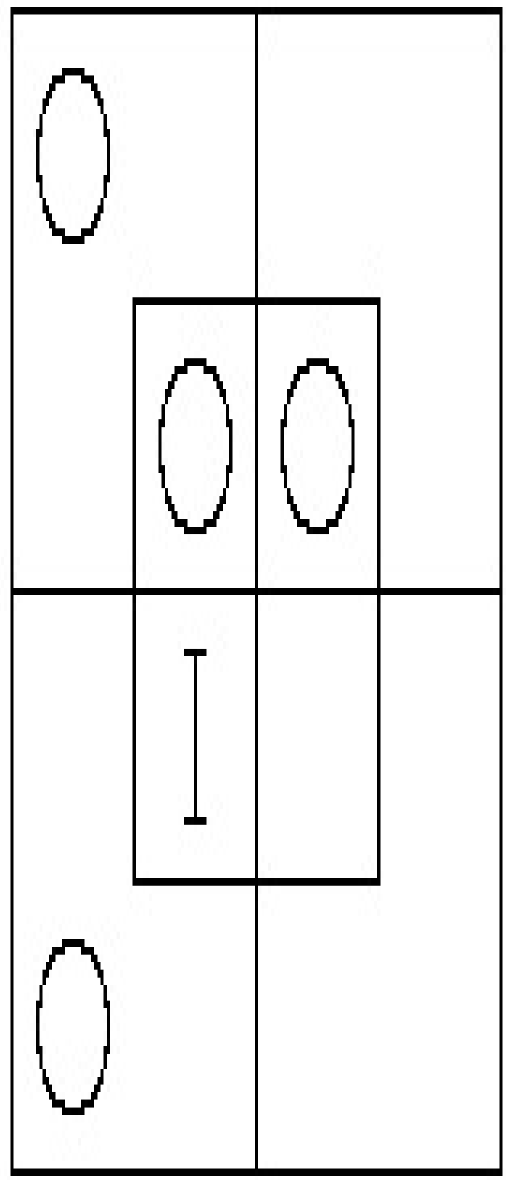

EX4

§ 4.

Pairs of Abstract Propositions, proposed as Premisses: Conclusions to be found.

1. No m are x′;

All m′ are y.

2. No m′ are x;

Some m′ are y′.

3. All m′ are x;

All m′ are y′.

4. No x′ are m′;

All y′ are m.

5. Some m are x′;

No y are m.

6. No x′ are m;

No m are y.

7. No m are x′;

Some y′ are m.

8. All m′ are x′;

No m′ are y.

9. Some x′ are m′;

No m are y′.

10. All x are m;

All y′ are m′.

11. No m are x;

All y′ are m′.

12. No x are m;

All y are m.

13. All m′ are x;

No y are m.

14. All m are x;

All m′ are y.

15. No x are m;

No m′ are y.

16. All x are m′;

All y are m.

17. No x are m;

All m′ are y.

18. No x are m′;

No m are y.

19. All m are x;

All m are y′.

20. No m are x;

All m′ are y.

21. All x are m;

Some m′ are y.

22. Some x are m;

All y are m.

23. All m are x;

Some y are m.

24. No x are m;

All y are m.

25. Some m are x′;

All y′ are m′.

26. No m are x′;

All y are m.

27. All x are m′;

All y′ are m.

28. All m are x′;

Some m are y.

29. No m are x;

All y are m′.

30. All x are m′;

Some y are m.

31. All x are m;

All y are m.

32. No x are m′;

All m are y.

33. No m are x;

No m are y.

34. No m are x′;

Some y are m.

35. No m are x;

All y are m.

36. All m are x′;

Some y are m.

37. All m are x;

No y are m.

38. No m are x;

No m′ are y.

39. Some m are x′;

No m are y.

40. No x′ are m;

All y′ are m.

41. All x are m′;

No y are m′.

42. No m′ are x;

No y are m.

EX5

§ 5.

Pairs of Concrete Propositions, proposed as Premisses: Conclusions to be found.

1. I have been out for a walk;

I am feeling better.

2. No one has read the letter but John;

No one, who has not read it, knows what it is about.

3. Those who are not old like walking;

You and I are young.

4. Your course is always honest;

Your course is always the best policy.

5. No fat creatures run well;

Some greyhounds run well.

6. Some, who deserve the fair, get their deserts;

None but the brave deserve the fair.

7. Some Jews are rich;

All Esquimaux are Gentiles.

8. Sugar-plums are sweet;

Some sweet things are liked by children.

9. John is in the house;

Everybody in the house is ill.

10. Umbrellas are useful on a journey;

What is useless on a journey should be left behind.

11. Audible music causes vibration in the air;

Inaudible music is not worth paying for.

12. Some holidays are rainy;

Rainy days are tiresome.

13. No Frenchmen like plumpudding;

All Englishmen like plumpudding.

14. No portrait of a lady, that makes her simper or scowl, is satisfactory;

No photograph of a lady ever fails to make her simper or scowl.

15. All pale people are phlegmatic;

No one looks poetical unless he is pale.

16. No old misers are cheerful;

Some old misers are thin.

17. No one, who exercises self-control, fails to keep his temper;

Some judges lose their tempers.

18. All pigs are fat;

Nothing that is fed on barley-water is fat.

19. All rabbits, that are not greedy, are black;

No old rabbits are free from greediness.

20. Some pictures are not first attempts;

No first attempts are really good.

21. I never neglect important business;

Your business is unimportant.

22. Some lessons are difficult;

What is difficult needs attention.

23. All clever people are popular;

All obliging people are popular.

24. Thoughtless people do mischief;

No thoughtful person forgets a promise.

25. Pigs cannot fly;

Pigs are greedy.

26. All soldiers march well;

Some babies are not soldiers.

27. No bride-cakes are wholesome;

What is unwholesome should be avoided.

28. John is industrious;

No industrious people are unhappy.

29. No philosophers are conceited;

Some conceited persons are not gamblers.

30. Some excise laws are unjust;

All the laws passed last week relate to excise.

31. No military men write poetry;

None of my lodgers are civilians.

32. No medicine is nice;

Senna is a medicine.

33. Some circulars are not read with pleasure;

No begging-letters are read with pleasure.

34. All Britons are brave;

No sailors are cowards.

35. Nothing intelligible ever puzzles me;

Logic puzzles me.

36. Some pigs are wild;

All pigs are fat.

37. All wasps are unfriendly;

All unfriendly creatures are unwelcome.

38. No old rabbits are greedy;

All black rabbits are greedy.

39. Some eggs are hard-boiled;

No eggs are uncrackable.

40. No antelope is ungraceful;

Graceful creatures delight the eye.

41. All well-fed canaries sing loud;

No canary is melancholy if it sings loud.

42. Some poetry is original;

No original work is producible at will.

43. No country, that has been explored, is infested by dragons;

Unexplored countries are fascinating.

44. No coals are white;

No niggers are white.

45. No bridges are made of sugar;

Some bridges are picturesque.

46. No children are patient;

No impatient person can sit still.

47. No quadrupeds can whistle;

Some cats are quadrupeds.

48. Bores are terrible;

You are a bore.

49. Some oysters are silent;

No silent creatures are amusing.

50. There are no Jews in the house;

No Gentiles have beards a yard long.

51. Canaries, that do not sing loud, are unhappy;

No well-fed canaries fail to sing loud.

52. All my sisters have colds;

No one can sing who has a cold.

53. All that is made of gold is precious;

Some caskets are precious.

54. Some buns are rich;

All buns are nice.

55. All my cousins are unjust;

All judges are just.

56. Pain is wearisome;

No pain is eagerly wished for.

57. All medicine is nasty;

Senna is a medicine.

58. Some unkind remarks are annoying;

No critical remarks are kind.

59. No tall men have woolly hair;

Niggers have woolly hair.

60. All philosophers are logical;

An illogical man is always obstinate.

61. John is industrious;

All industrious people are happy.

62. These dishes are all well-cooked;

Some dishes are unwholesome if not well-cooked.

63. No exciting books suit feverish patients;

Unexciting books make one drowsy.

64. No pigs can fly;

All pigs are greedy.

65. When a man knows what he’s about, he can detect a sharper;

You and I know what we’re about.

66. Some dreams are terrible;

No lambs are terrible.

67. No bald creature needs a hairbrush;

No lizards have hair.

68. All battles are noisy;

What makes no noise may escape notice.

69. All my cousins are unjust;

No judges are unjust.

70. All eggs can be cracked;

Some eggs are hard-boiled.

71. Prejudiced persons are untrustworthy;

Some unprejudiced persons are disliked.

72. No dictatorial person is popular;

She is dictatorial.

73. Some bald people wear wigs;

All your children have hair.

74. No lobsters are unreasonable;

No reasonable creatures expect impossibilities.

75. No nightmare is pleasant;

Unpleasant experiences are not eagerly desired.

76. No plumcakes are wholesome;

Some wholesome things are nice.

77. Nothing that is nice need be shunned;

Some kinds of jam are nice.

78. All ducks waddle;

Nothing that waddles is graceful.

79. Sandwiches are satisfying;

Nothing in this dish is unsatisfying.

80. No rich man begs in the street;

Those who are not rich should keep accounts.

81. Spiders spin webs;

Some creatures, that do not spin webs, are savage.

82. Some of these shops are not crowded;

No crowded shops are comfortable.

83. Prudent travelers carry plenty of small change;

Imprudent travelers lose their luggage.

84. Some geraniums are red;

All these flowers are red.

85. None of my cousins are just;

All judges are just.

86. No Jews are mad;

All my lodgers are Jews.

87. Busy folk are not always talking about their grievances;

Discontented folk are always talking about their grievances.

88. None of my cousins are just;

No judges are unjust.

89. All teetotalers like sugar;

No nightingale drinks wine.

90. No riddles interest me if they can be solved;

All these riddles are insoluble.

91. All clear explanations are satisfactory;

Some excuses are unsatisfactory.

92. All elderly ladies are talkative;

All good-tempered ladies are talkative.

93. No kind deed is unlawful;

What is lawful may be done without scruple.

94. No babies are studious;

No babies are good violinists.

95. All shillings are round;

All these coins are round.

96. No honest men cheat;

No dishonest men are trustworthy.

97. None of my boys are clever;

None of my girls are greedy.

98. All jokes are meant to amuse;

No Act of Parliament is a joke.

99. No eventful tour is ever forgotten;

Uneventful tours are not worth writing a book about.

100. All my boys are disobedient;

All my girls are discontented.

101. No unexpected pleasure annoys me;

Your visit is an unexpected pleasure.

EX6

§ 6.

Trios of Abstract Propositions, proposed as Syllogisms: to be examined.

1. Some x are m;	No m are y′.	Some x are y.
2. All x are m;	No y are m′.	No y are x′.
3. Some x are m′;	All y′ are m.	Some x are y.
4. All x are m;	No y are m.	All x are y′.
5. Some m′ are x′;	No m′ are y.	Some x′ are y′.
6. No x′ are m;	All y are m′.	All y are x′.
7. Some m′ are x′;	All y′ are m′.	Some x′ are y′.
8. No m′ are x′;	All y′ are m′.	All y′ are x.
9. Some m are x′;	No m are y.	Some x′ are y′.
10. All m′ are x′;	All m′ are y.	Some y are x′.

11. All x are m';	Some y are m.	Some y are x'.
12. No x are m;	No m' are y'.	No x are y'.
13. No x are m;	All y' are m.	All y' are x'.
14. All m' are x';	All m' are y.	Some y are x'.
15. Some m are x';	All y are m'.	Some x' are y'.
16. No x' are m;	All y' are m'.	Some y' are x.
17. No m' are x;	All m' are y'.	Some x' are y'.
18. No x' are m;	Some m are y.	Some x are y.
19. Some m are x;	All m are y.	Some y are x'.
20. No x' are m';	Some m' are y'.	Some x are y'.
21. No m are x;	All m are y'.	Some x' are y'.
22. All x' are m;	Some y are m'.	All x' are y'.
23. All m are x;	No m' are y'.	No x' are y'.
24. All x are m';	All m' are y.	All x are y.

25. No x are m′;	All m are y.	No x are y′.
26. All m are x′;	All y are m.	All y are x′.
27. All x are m;	No m are y′.	All x are y.
28. All x are m;	No y′ are m′.	All x are y.
29. No x′ are m;	No m′ are y′.	No x′ are y′.
30. All x are m;	All m are y′.	All x are y′.
31. All x′ are m′;	No y′ are m′.	All x′ are y.
32. No x are m;	No y′ are m′.	No x are y′.
33. All m are x′;	All y′ are m.	All y′ are x′.
34. All x are m′;	Some y are m′.	Some y are x.
35. Some x are m;	All m are y.	Some x are y.
36. All m are x′;	All y are m.	All y are x′.
37. No m are x′;	All m are y′.	Some x are y′.
38. No x are m;	No m are y′.	No x are y′.

39. No m are x; Some m are y′. Some x′ are y′.

40. No m are x′; Some y are m. Some x are y.

EX7

§ 7.

Trios of Concrete Propositions, proposed as Syllogisms: to be examined.

1. No doctors are enthusiastic;

You are enthusiastic.

You are not a doctor.

2. Dictionaries are useful;

Useful books are valuable.

Dictionaries are valuable.

3. No misers are unselfish;

None but misers save egg-shells.

No unselfish people save egg-shells.

4. Some epicures are ungenerous;

All my uncles are generous.

My uncles are not epicures.

5. Gold is heavy;

Nothing but gold will silence him.

Nothing light will silence him.

6. Some healthy people are fat;

No unhealthy people are strong.

Some fat people are not strong.

7. “I saw it in a newspaper.”

“All newspapers tell lies.”

It was a lie.

8. Some cravats are not artistic;

I admire anything artistic.

There are some cravats that I do not admire.

9. His songs never last an hour;

A song, that lasts an hour, is tedious.

His songs are never tedious.

10. Some candles give very little light;

Candles are meant to give light.

Some things, that are meant to give light, give very little.

11. All, who are anxious to learn, work hard;

Some of these boys work hard.

Some of these boys are anxious to learn.

12. All lions are fierce;

Some lions do not drink coffee.

Some creatures that drink coffee are not fierce.

13. No misers are generous;

Some old men are ungenerous.

Some old men are misers.

14. No fossil can be crossed in love;

An oyster may be crossed in love.

Oysters are not fossils.

15. All uneducated people are shallow;

Students are all educated.

No students are shallow.

16. All young lambs jump;

No young animals are healthy, unless they jump.

All young lambs are healthy.

17. Ill-managed business is unprofitable;

Railways are never ill-managed.

All railways are profitable.

18. No Professors are ignorant;

All ignorant people are vain.

No professors are vain.

19. A prudent man shuns hyænas;

No banker is imprudent.

No banker fails to shun hyænas.

20. All wasps are unfriendly;

No puppies are unfriendly.

Puppies are not wasps.

21. No Jews are honest;

Some Gentiles are rich.

Some rich people are dishonest.

22. No idlers win fame;

Some painters are not idle.

Some painters win fame.

23. No monkeys are soldiers;

All monkeys are mischievous.

Some mischievous creatures are not soldiers.

24. All these bonbons are chocolate-creams;

All these bonbons are delicious.

Chocolate-creams are delicious.

25. No muffins are wholesome;

All buns are unwholesome.

Buns are not muffins.

26. Some unauthorised reports are false;

All authorised reports are trustworthy.

Some false reports are not trustworthy.

27. Some pillows are soft;

No pokers are soft.

Some pokers are not pillows.

28. Improbable stories are not easily believed;

None of his stories are probable.

None of his stories are easily believed.

29. No thieves are honest;

Some dishonest people are found out.

Some thieves are found out.

30. No muffins are wholesome;

All puffy food is unwholesome.

All muffins are puffy.

31. No birds, except peacocks, are proud of their tails;

Some birds, that are proud of their tails, cannot sing.

Some peacocks cannot sing.

32. Warmth relieves pain;

Nothing, that does not relieve pain, is useful in toothache.

Warmth is useful in toothache.

33. No bankrupts are rich;

Some merchants are not bankrupts.

Some merchants are rich.

34. Bores are dreaded;

No bore is ever begged to prolong his visit.

No one, who is dreaded, is ever begged to prolong his visit.

35. All wise men walk on their feet;

All unwise men walk on their hands.

No man walks on both.

36. No wheelbarrows are comfortable;

No uncomfortable vehicles are popular.

No wheelbarrows are popular.

37. No frogs are poetical;

Some ducks are unpoetical.

Some ducks are not frogs.

38. No emperors are dentists;

All dentists are dreaded by children.

No emperors are dreaded by children.

39. Sugar is sweet;

Salt is not sweet.

Salt is not sugar.

40. Every eagle can fly;

Some pigs cannot fly.

Some pigs are not eagles.

EX8

§ 8.

Sets of Abstract Propositions, proposed as Premisses for Soriteses: Conclusions to be found.

[N.B. At the end of this Section instructions are given for varying these Examples.]

1.

1. No c are d;

2. All a are d;

3. All b are c.

2.

1. All d are b;

2. No a are c′;

3. No b are c.

3.

1. No b are a;

2. No c are d′;

3. All d are b.

4.

1. No b are c;

2. All a are b;

3. No c′ are d.

5.

1. All b′ are a′;

2. No b are c;

3. No a′ are d.

6.

1. All a are b′;

2. No b′ are c;

3. All d are a.

7.

1. No d are b′;

2. All b are a;

3. No c are d′.

8.

1. No b′ are d;

2. No a′ are b;

3. All c are d.

9.

1. All b′ are a;

2. No a are d;

3. All b are c.

10.

1. No c are d;

2. All b are c;

3. No a are d′.

11.

1. No b are c;

2. All d are a;

3. All c′ are a′.

12.

1. No c are b′;

2. All c′ are d′;

3. All b are a.

13.

1. All d are e;

2. All c are a;

3. No b are d′;

4. All e are a′.

14.

1. All e are b;

2. All a are e;

3. All d are b′;

4. All a′ are c;

15.

1. No b′ are d;

2. All e are c;

3. All b are a;

4. All d′ are c′.

16.

1. No a′ are e;

2. All d are c′;

3. All a are b;

4. All e′ are d.

17.

1. All d are c;

2. All a are e;

3. No b are d′;

4. All c are e′.

18.

1. All a are b;

2. All d are e;

3. All a′ are c′;

4. No b are e.

19.

1. No b are c;

2. All e are h;

3. All a are b;

4. No d are h;

5. All e′ are c.

20.

1. No d are h′;

2. No c are e;

3. All h are b;

4. No a are d′;

5. No b are e′.

21.

1. All b are a;

2. No d are h;

3. No c are e;

4. No a are h′;

5. All c′ are b.

22.

1. All e are d′;

2. No b′ are h′;

3. All c′ are d;

4. All a are e;

5. No c are h.

23.

1. All b′ are a′;

2. No d are e′;

3. All h are b′;

4. No c are e;

5. All d′ are a.

24.

1. All h′ are k′;

2. No b′ are a;

3. All c are d;

4. All e are h′;

5. No d are k′;

6. No b are c′.

25.

1. All a are d;

2. All k are b;

3. All e are h;

4. No a′ are b;

5. All d are c;

6. All h are k.

26.

1. All a′ are h;

2. No d′ are k′;

3. All e are b′;

4. No h are k;

5. All a are e;

6. No b′ are d.

27.

1. All c are d′;

2. No h are b;

3. All a′ are k;

4. No c are e′;

5. All b′ are d;

6. No a are c′.

28.

1. No a′ are k;

2. All e are b;

3. No h are k′;

4. No d′ are c;

5. No a are b;

6. All c′ are h.

29.

1. No e are k;

2. No b′ are m;

3. No a are c′;

4. All h′ are e;

5. All d are k;

6. No c are b;

7. All d′ are l;

8. No h are m′.

30.

1. All n are m;

2. All a′ are e;

3. No c′ are l;

4. All k are r′;

5. No a are h′;

6. No d are l′;

7. No c are n′;

8. All e are b;

9. All m are r;

10. All h are d.

[N.B. In each Example, in Sections 8 and 9, it is possible to begin with any Premiss, at pleasure, and thus to get as many different Solutions (all of course yielding the same Complete Conclusion) as there are Premisses in the Example. Hence § 8 really contains 129 different Examples, and § 9 contains 273.]

EX9

§ 9.

Sets of Concrete Propositions, proposed as Premisses for Soriteses: Conclusions to be found.

1.

(1) Babies are illogical;

(2) Nobody is despised who can manage a crocodile;

(3) Illogical persons are despised.

Univ. “persons”; a = able to manage a crocodile; b = babies; c = despised; d = logical.

2.

(1) My saucepans are the only things I have that are made of tin;

(2) I find all your presents very useful;

(3) None of my saucepans are of the slightest use.

Univ. “things of mine”; a = made of tin; b = my saucepans; c = useful; d = your presents.

3.

(1) No potatoes of mine, that are new, have been boiled;

(2) All my potatoes in this dish are fit to eat;

(3) No unboiled potatoes of mine are fit to eat.

Univ. “my potatoes”; a = boiled; b = eatable; c = in this dish; d = new.

4.

(1) There are no Jews in the kitchen;

(2) No Gentiles say “shpoonj”;

(3) My servants are all in the kitchen.

Univ. “persons”; a = in the kitchen; b = Jews; c = my servants; d = saying “shpoonj.”

5.

(1) No ducks waltz;

(2) No officers ever decline to waltz;

(3) All my poultry are ducks.

Univ. “creatures”; a = ducks; b = my poultry; c = officers; d = willing to waltz.

6.

(1) Every one who is sane can do Logic;

(2) No lunatics are fit to serve on a jury;

(3) None of your sons can do Logic.

Univ. “persons”; a = able to do Logic; b = fit to serve on a jury; c = sane; d = your sons.

7.

(1) There are no pencils of mine in this box;

(2) No sugar-plums of mine are cigars;

(3) The whole of my property, that is not in this box, consists of cigars.

Univ. “things of mine”; a = cigars; b = in this box; c = pencils; d = sugar-plums.

8.

(1) No experienced person is incompetent;

(2) Jenkins is always blundering;

(3) No competent person is always blundering.

Univ. “persons”; a = always blundering; b = competent; c = experienced; d = Jenkins.

9.

(1) No terriers wander among the signs of the zodiac;

(2) Nothing, that does not wander among the signs of the zodiac, is a comet;

(3) Nothing but a terrier has a curly tail.

Univ. “things”; a = comets; b = curly-tailed; c = terriers; d = wandering among the signs of the zodiac.

10.

(1) No one takes in the Times, unless he is well-educated;

(2) No hedge-hogs can read;

(3) Those who cannot read are not well-educated.

Univ. “creatures”; a = able to read; b = hedge-hogs; c = taking in the Times; d =

well-educated.

11.

(1) All puddings are nice;

(2) This dish is a pudding;

(3) No nice things are wholesome.

Univ. “things”; a = nice; b = puddings; c = this dish; d = wholesome.

12.

(1) My gardener is well worth listening to on military subjects;

(2) No one can remember the battle of Waterloo, unless he is very old;

(3) Nobody is really worth listening to on military subjects, unless he can remember the battle of Waterloo.

Univ. “persons”; a = able to remember the battle of Waterloo; b = my gardener; c = well worth listening to on military subjects; d = very old.

13.

(1) All humming-birds are richly coloured;

(2) No large birds live on honey;

(3) Birds that do not live on honey are dull in colour.

Univ. “birds”; a = humming-birds; b = large; c = living on honey; d = richly coloured.

14.

(1) No Gentiles have hooked noses;

(2) A man who is a good hand at a bargain always makes money;

(3) No Jew is ever a bad hand at a bargain.

Univ. “persons”; a = good hands at a bargain; b = hook-nosed; c = Jews; d = making money.

15.

(1) All ducks in this village, that are branded ‘B,’ belong to Mrs. Bond;

(2) Ducks in this village never wear lace collars, unless they are branded ‘B’;

(3) Mrs. Bond has no gray ducks in this village.

Univ. “ducks in this village”; a = belonging to Mrs. Bond; b = branded ‘B’; c = gray; d = wearing lace-collars.

16.

(1) All the old articles in this cupboard are cracked;

(2) No jug in this cupboard is new;

(3) Nothing in this cupboard, that is cracked, will hold water.

Univ. “things in this cupboard”; a = able to hold water; b = cracked; c = jugs; d = old.

17.

(1) All unripe fruit is unwholesome;

(2) All these apples are wholesome;

(3) No fruit, grown in the shade, is ripe.

Univ. “fruit”; a = grown in the shade; b = ripe; c = these apples; d = wholesome.

18.

(1) Puppies, that will not lie still, are always grateful for the loan of a skipping-rope;

(2) A lame puppy would not say “thank you” if you offered to lend it a skipping-rope.

(3) None but lame puppies ever care to do worsted-work.

Univ. “puppies”; a = caring to do worsted-work; b = grateful for the loan of a skipping-rope; c = lame; d = willing to lie still.

19.

(1) No name in this list is unsuitable for the hero of a romance;

(2) Names beginning with a vowel are always melodious;

(3) No name is suitable for the hero of a romance, if it begins with a consonant.

Univ. “names”; a = beginning with a vowel; b = in this list; c = melodious; d = suitable for the hero of a romance.

20.

(1) All members of the House of Commons have perfect self-command;

(2) No M.P., who wears a coronet, should ride in a donkey-race;

(3) All members of the House of Lords wear coronets.

Univ. “M.P.’s”; a = belonging to the House of Commons; b = having perfect self-command; c = one who may ride in a donkey-race; d = wearing a coronet.

21.

(1) No goods in this shop, that have been bought and paid for, are still on sale;

(2) None of the goods may be carried away, unless labeled “sold”;

(3) None of the goods are labeled “sold,” unless they have been bought and paid for.

Univ. “goods in this shop”; a = allowed to be carried away; b = bought and paid for; c = labeled “sold”; d = on sale.

22.

(1) No acrobatic feats, that are not announced in the bills of a circus, are ever attempted there;

(2) No acrobatic feat is possible, if it involves turning a quadruple somersault;

(3) No impossible acrobatic feat is ever announced in a circus bill.

Univ. “acrobatic feats”; a = announced in the bills of a circus; b = attempted in a circus; c = involving the turning of a quadruple somersault; d = possible.

23.

(1) Nobody, who really appreciates Beethoven, fails to keep silence while the Moonlight-Sonata is being played;

(2) Guinea-pigs are hopelessly ignorant of music;

(3) No one, who is hopelessly ignorant of music, ever keeps silence while the Moonlight-Sonata is being played.

Univ. “creatures”; a = guinea-pigs; b = hopelessly ignorant of music; c = keeping silence while the Moonlight-Sonata is being played; d = really appreciating Beethoven.

24.

(1) Coloured flowers are always scented;

(2) I dislike flowers that are not grown in the open air;

(3) No flowers grown in the open air are colourless.

Univ. “flowers”; a = coloured; b = grown in the open air; c = liked by me; d = scented.

25.

(1) Showy talkers think too much of themselves;

(2) No really well-informed people are bad company;

(3) People who think too much of themselves are not good company.

Univ. “persons”; a = good company; b = really well-informed; c = showy talkers; d = thinking too much of one’s self.

26.

(1) No boys under 12 are admitted to this school as boarders;

(2) All the industrious boys have red hair;

(3) None of the day-boys learn Greek;

(4) None but those under 12 are idle.

Univ. “boys in this school”; a = boarders; b = industrious; c = learning Greek; d = red-haired; e = under 12.

27.

(1) The only articles of food, that my doctor allows me, are such as are not very rich;

(2) Nothing that agrees with me is unsuitable for supper;

(3) Wedding-cake is always very rich;

(4) My doctor allows me all articles of food that are suitable for supper.

Univ. “articles of food”; a = agreeing with me; b = allowed by my doctor; c = suitable for supper; d = very rich; e = wedding-cake.

28.

(1) No discussions in our Debating-Club are likely to rouse the British Lion, so long as they are checked when they become too noisy;

(2) Discussions, unwisely conducted, endanger the peacefulness of our Debating-Club;

(3) Discussions, that go on while Tomkins is in the Chair, are likely to rouse the British Lion;

(4) Discussions in our Debating-Club, when wisely conducted, are always checked when they become too noisy.

Univ. “discussions in our Debating-Club”; a = checked when too noisy; b = dangerous to the peacefulness of our Debating-Club; c = going on while Tomkins is in the chair; d = likely to rouse the British Lion; e = wisely conducted.

29.

(1) All my sons are slim;

(2) No child of mine is healthy who takes no exercise;

(3) All gluttons, who are children of mine, are fat;

(4) No daughter of mine takes any exercise.

Univ. “my children”; a = fat; b = gluttons; c = healthy; d = sons; e = taking exercise.

30.

(1) Things sold in the street are of no great value;

(2) Nothing but rubbish can be had for a song;

(3) Eggs of the Great Auk are very valuable;

(4) It is only what is sold in the street that is really rubbish.

Univ. “things”; a = able to be had for a song; b = eggs of the Great Auk; c = rubbish; d = sold in the street; e = very valuable.

31.

(1) No books sold here have gilt edges, except what are in the front shop;

(2) All the authorised editions have red labels;

(3) All the books with red labels are priced at 5s. and upwards;

(4) None but authorised editions are ever placed in the front shop.

Univ. “books sold here”; a = authorised editions; b = gilt-edged; c = having red labels; d = in the front shop; e = priced at 5s. and upwards.

32.

(1) Remedies for bleeding, which fail to check it, are a mockery;

(2) Tincture of Calendula is not to be despised;

(3) Remedies, which will check the bleeding when you cut your finger, are useful;

(4) All mock remedies for bleeding are despicable.

Univ. “remedies for bleeding”; a = able to check bleeding; b = despicable; c = mockeries; d = Tincture of Calendula; e = useful when you cut your finger.

33.

(1) None of the unnoticed things, met with at sea, are mermaids;

(2) Things entered in the log, as met with at sea, are sure to be worth remembering;

(3) I have never met with anything worth remembering, when on a voyage;

(4) Things met with at sea, that are noticed, are sure to be recorded in the log;

Univ. “things met with at sea”; a = entered in log; b = mermaids; c = met with by me; d = noticed; e = worth remembering.

34.

(1) The only books in this library, that I do not recommend for reading, are unhealthy in tone;

(2) The bound books are all well-written;

(3) All the romances are healthy in tone;

(4) I do not recommend you to read any of the unbound books.

Univ. “books in this library”; a = bound; b = healthy in tone; c = recommended by me; d = romances; e = well-written.

35.

(1) No birds, except ostriches, are 9 feet high;

(2) There are no birds in this aviary that belong to any one but me;

(3) No ostrich lives on mince-pies;

(4) I have no birds less than 9 feet high.

Univ. “birds”; a = in this aviary; b = living on mince-pies; c = my; d = 9 feet high; e = ostriches.

36.

(1) A plum-pudding, that is not really solid, is mere porridge;

(2) Every plum-pudding, served at my table, has been boiled in a cloth;

(3) A plum-pudding that is mere porridge is indistinguishable from soup;

(4) No plum-puddings are really solid, except what are served at my table.

Univ. “plum-puddings”; a = boiled in a cloth; b = distinguishable from soup; c = mere porridge; d = really solid; e = served at my table.

37.

(1) No interesting poems are unpopular among people of real taste;

(2) No modern poetry is free from affectation;

(3) All your poems are on the subject of soap-bubbles;

(4) No affected poetry is popular among people of real taste;

(5) No ancient poem is on the subject of soap-bubbles.

Univ. “poems”; a = affected; b = ancient; c = interesting; d = on the subject of soap-bubbles; e = popular among people of real taste; h = written by you.

38.

(1) All the fruit at this Show, that fails to get a prize, is the property of the Committee;

(2) None of my peaches have got prizes;

(3) None of the fruit, sold off in the evening, is unripe;

(4) None of the ripe fruit has been grown in a hot-house;

(5) All fruit, that belongs to the Committee, is sold off in the evening.

Univ. “fruit at this Show”; a = belonging to the Committee; b = getting prizes; c = grown in a hot-house; d = my peaches; e = ripe; h = sold off in the evening.

39.

(1) Promise-breakers are untrustworthy;

(2) Wine-drinkers are very communicative;

(3) A man who keeps his promises is honest;

(4) No teetotalers are pawnbrokers;

(5) One can always trust a very communicative person.

Univ. “persons”; a = honest; b = pawnbrokers; c = promise-breakers; d = trustworthy; e = very communicative; h = wine-drinkers.

40.

(1) No kitten, that loves fish, is unteachable;

(2) No kitten without a tail will play with a gorilla;

(3) Kittens with whiskers always love fish;

(4) No teachable kitten has green eyes;

(5) No kittens have tails unless they have whiskers.

Univ. “kittens”; a = green-eyed; b = loving fish; c = tailed; d = teachable; e = whiskered; h = willing to play with a gorilla.

41.

(1) All the Eton men in this College play cricket;

(2) None but the Scholars dine at the higher table;

(3) None of the cricketers row;

(4) My friends in this College all come from Eton;

(5) All the Scholars are rowing-men.

Univ. “men in this College”; a = cricketers; b = dining at the higher table; c = Etonians; d = my friends; e = rowing-men; h = Scholars.

42.

(1) There is no box of mine here that I dare open;

(2) My writing-desk is made of rose-wood;

(3) All my boxes are painted, except what are here;

(4) There is no box of mine that I dare not open, unless it is full of live scorpions;

(5) All my rose-wood boxes are unpainted.

Univ. “my boxes”; a = boxes that I dare open; b = full of live scorpions; c = here; d = made of rose-wood; e = painted; h = writing-desks.

43.

(1) Gentiles have no objection to pork;

(2) Nobody who admires pigsties ever reads Hogg’s poems;

(3) No Mandarin knows Hebrew;

(4) Every one, who does not object to pork, admires pigsties;

(5) No Jew is ignorant of Hebrew.

Univ. “persons”; a = admiring pigsties; b = Jews; c = knowing Hebrew; d = Mandarins; e = objecting to pork; h = reading Hogg’s poems.

44.

(1) All writers, who understand human nature, are clever;

(2) No one is a true poet unless he can stir the hearts of men;

(3) Shakespeare wrote “Hamlet”;

(4) No writer, who does not understand human nature, can stir the hearts of men;

(5) None but a true poet could have written “Hamlet.”;

Univ. “writers”; a = able to stir the hearts of men; b = clever; c = Shakespeare; d = true poets; e = understanding human nature; h = writer of ‘Hamlet.’

45.

(1) I despise anything that cannot be used as a bridge;

(2) Everything, that is worth writing an ode to, would be a welcome gift to me;

(3) A rainbow will not bear the weight of a wheel-barrow;

(4) Whatever can be used as a bridge will bear the weight of a wheel-barrow;

(5) I would not take, as a gift, a thing that I despise.

Univ. “things”; a = able to bear the weight of a wheel-barrow; b = acceptable to me; c = despised by me; d = rainbows; e = useful as a bridge; h = worth writing an ode to.

46.

(1) When I work a Logic-example without grumbling, you may be sure it is one that I can understand;

(2) These Soriteses are not arranged in regular order, like the examples I am used to;

(3) No easy example ever make my head ache;

(4) I ca’n’t understand examples that are not arranged in regular order, like those I am used to;

(5) I never grumble at an example, unless it gives me a headache.

Univ. “Logic-examples worked by me”; a = arranged in regular order, like the examples I am used to; b = easy; c = grumbled at by me; d = making my head ache; e = these Soriteses; h = understood by me.

47.

(1) Every idea of mine, that cannot be expressed as a Syllogism, is really ridiculous;

(2) None of my ideas about Bath-buns are worth writing down;

(3) No idea of mine, that fails to come true, can be expressed as a Syllogism;

(4) I never have any really ridiculous idea, that I do not at once refer to my solicitor;

(5) My dreams are all about Bath-buns;

(6) I never refer any idea of mine to my solicitor, unless it is worth writing down.

Univ. “my ideas”; a = able to be expressed as a Syllogism; b = about Bath-buns; c = coming true; d = dreams; e = really ridiculous h = referred to my solicitor; k = worth writing down.

48.

(1) None of the pictures here, except the battle-pieces, are valuable;

(2) None of the unframed ones are varnished;

(3) All the battle-pieces are painted in oils;

(4) All those that have been sold are valuable;

(5) All the English ones are varnished;

(6) All those in frames have been sold.

Univ. “the pictures here”; a = battle-pieces; b = English; c = framed; d = oil-paintings; e = sold; h = valuable; k = varnished.

49.

(1) Animals, that do not kick, are always unexcitable;

(2) Donkeys have no horns;

(3) A buffalo can always toss one over a gate;

(4) No animals that kick are easy to swallow;

(5) No hornless animal can toss one over a gate;

(6) All animals are excitable, except buffaloes.

Univ. “animals”; a = able to toss one over a gate; b = buffaloes; c = donkeys; d = easy to swallow; e = excitable; h = horned; k = kicking.

50.

(1) No one, who is going to a party, ever fails to brush his hair;

(2) No one looks fascinating, if he is untidy;

(3) Opium-eaters have no self-command;

(4) Every one, who has brushed his hair, looks fascinating;

(5) No one wears white kid gloves, unless he is going to a party;

(6) A man is always untidy, if he has no self-command.

Univ. “persons”; a = going to a party; b = having brushed one’s hair; c = having self-command; d = looking fascinating; e = opium-eaters; h = tidy; k = wearing white kid gloves.

51.

(1) No husband, who is always giving his wife new dresses, can be a cross-grained man;

(2) A methodical husband always comes home for his tea;

(3) No one, who hangs up his hat on the gas-jet, can be a man that is kept in proper order by his wife;

(4) A good husband is always giving his wife new dresses;

(5) No husband can fail to be cross-grained, if his wife does not keep him in proper order;

(6) An unmethodical husband always hangs up his hat on the gas-jet.

Univ. “husbands”; a = always coming home for his tea; b = always giving his wife new dresses; c = cross-grained; d = good; e = hanging up his hat on the gas-jet; h = kept in proper order; k = methodical.

52.

(1) Everything, not absolutely ugly, may be kept in a drawing-room;

(2) Nothing, that is encrusted with salt, is ever quite dry;

(3) Nothing should be kept in a drawing-room, unless it is free from damp;

(4) Bathing-machines are always kept near the sea;

(5) Nothing, that is made of mother-of-pearl, can be absolutely ugly;

(6) Whatever is kept near the sea gets encrusted with salt.

Univ. “things”; a = absolutely ugly; b = bathing-machines; c = encrusted with salt; d = kept near the sea; e = made of mother-of-pearl; h = quite dry; k = things that may be kept in a drawing-room.

53.

(1) I call no day “unlucky,” when Robinson is civil to me;

(2) Wednesdays are always cloudy;

(3) When people take umbrellas, the day never turns out fine;

(4) The only days when Robinson is uncivil to me are Wednesdays;

(5) Everybody takes his umbrella with him when it is raining;

(6) My “lucky” days always turn out fine.

Univ. “days”; a = called by me ‘lucky’; b = cloudy; c = days when people take umbrellas; d = days when Robinson is civil to me; e = rainy; h = turning out fine; k = Wednesdays.

54.

(1) No shark ever doubts that it is well fitted out;

(2) A fish, that cannot dance a minuet, is contemptible;

(3) No fish is quite certain that it is well fitted out, unless it has three rows of teeth;

(4) All fishes, except sharks, are kind to children;

(5) No heavy fish can dance a minuet;

(6) A fish with three rows of teeth is not to be despised.

Univ. “fishes”; a = able to dance a minuet; b = certain that he is well fitted out; c = contemptible; d = having 3 rows of teeth; e = heavy; h = kind to children; k = sharks.

55.

(1) All the human race, except my footmen, have a certain amount of common-sense;

(2) No one, who lives on barley-sugar, can be anything but a mere baby;

(3) None but a hop-scotch player knows what real happiness is;

(4) No mere baby has a grain of common sense;

(5) No engine-driver ever plays hop-scotch;

(6) No footman of mine is ignorant of what true happiness is.

Univ. “human beings”; a = engine-drivers; b = having common sense; c = hop-scotch players; d = knowing what real happiness is; e = living on barley-sugar; h = mere babies; k = my footmen.

56.

(1) I trust every animal that belongs to me;

(2) Dogs gnaw bones;

(3) I admit no animals into my study, unless they will beg when told to do so;

(4) All the animals in the yard are mine;

(5) I admit every animal, that I trust, into my study;

(6) The only animals, that are really willing to beg when told to do so, are dogs.

Univ. “animals”; a = admitted to my study; b = animals that I trust; c = dogs; d = gnawing bones; e = in the yard; h = my; k = willing to beg when told.

57.

(1) Animals are always mortally offended if I fail to notice them;

(2) The only animals that belong to me are in that field;

(3) No animal can guess a conundrum, unless it has been properly trained in a Board-School;

(4) None of the animals in that field are badgers;

(5) When an animal is mortally offended, it always rushes about wildly and howls;

(6) I never notice any animal, unless it belongs to me;

(7) No animal, that has been properly trained in a Board-School, ever rushes about wildly and howls.

Univ. “animals”; a = able to guess a conundrum; b = badgers; c = in that field; d = mortally offended; e = my; h = noticed by me; k = properly trained in a Board-School; l = rushing about wildly and howling.

58.

(1) I never put a cheque, received by me, on that file, unless I am anxious about it;

(2) All the cheques received by me, that are not marked with a cross, are payable to bearer;

(3) None of them are ever brought back to me, unless they have been dishonoured at the Bank;

(4) All of them, that are marked with a cross, are for amounts of over £100;

(5) All of them, that are not on that file, are marked “not negotiable”;

(6) No cheque of yours, received by me, has ever been dishonoured;

(7) I am never anxious about a cheque, received by me, unless it should happen to be brought back to me;

(8) None of the cheques received by me, that are marked “not negotiable,” are for amounts of over £100.

Univ. “cheques received by me”; a = brought back to me; b = cheques that I am anxious about; c = honoured; d = marked with a cross; e = marked ‘not negotiable’; h = on that file; k = over £100; l = payable to bearer; m = your.

59.

(1) All the dated letters in this room are written on blue paper;

(2) None of them are in black ink, except those that are written in the third person;

(3) I have not filed any of them that I can read;

(4) None of them, that are written on one sheet, are undated;

(5) All of them, that are not crossed, are in black ink;

(6) All of them, written by Brown, begin with “Dear Sir”;

(7) All of them, written on blue paper, are filed;

(8) None of them, written on more than one sheet, are crossed;

(9) None of them, that begin with “Dear Sir,” are written in the third person.

Univ. “letters in this room”; a = beginning with “Dear Sir”; b = crossed; c = dated; d = filed; e = in black ink; h = in third person; k = letters that I can read; l = on blue paper; m = on one sheet; n = written by Brown.

60.

(1) The only animals in this house are cats;

(2) Every animal is suitable for a pet, that loves to gaze at the moon;

(3) When I detest an animal, I avoid it;

(4) No animals are carnivorous, unless they prowl at night;

(5) No cats fails to kill mice;

(6) No animals ever take to me, except what are in this house;

(7) Kangaroos are not suitable for pets;

(8) None but carnivora kill mice;

(9) I detest animals that do not take to me;

(10) Animals, that prowl at night, always love to gaze at the moon.

Univ. “animals”; a = avoided by me; b = carnivora; c = cats; d = detested by me; e = in this house; h = kangaroos; k = killing mice; l = loving to gaze at the moon; m = prowling at night; n = suitable for pets; r = taking to me.

CHAPTER II.

ANSWERS.

Table of Contents

AN1

Answers to § 1.

1.“All” “persons represented by the Name ‘I’” (or “I’s”) “are” “persons who ha

or, more briefly,

“All | ‘I’s | are | persons who have been out for a walk”.

2. “All | ‘I’s | are | persons who feel better”.

3. “No | persons who are not ‘John’ | are | persons who have read the letter”.

4. “No | Members of the Class ‘you and I’ | are | old persons”.

5. “No | fat creatures | are | creatures that run well”.

6. “No | not-brave persons | are | persons deserving of the fair”.

7. “No | not-pale persons | are | persons who look poetical”.

8. “Some | judges | are | persons who lose their tempers”.

9. “All | ‘I’s | are | persons who do not neglect important business”.

10. “All | difficult things | are | things that need attention”.

11. “All | unwholesome things | are | things that should be avoided”.

12. “All | laws passed last week | are | laws relating to excise”.

13. “All | logical studies | are | things that puzzle me”.

14. “No | persons in the house | are | Jews”.

15. “Some | not well-cooked dishes | are | unwholesome dishes”.

16. “All | unexciting books | are | books that make one drowsy”.

17. “All | men who know what they’re about | are | men who can detect a sharper”.

18. “All | Members of the Class ‘you and I’ | are | persons who know what they’re about”.

19. “Some | bald persons | are | persons accustomed to wear wigs”.

20. “All | fully occupied persons | are | persons who do not talk about their grievances”.

21. “No | riddles that can be solved | are | riddles that interest me”.

AN2

Answers to § 2.

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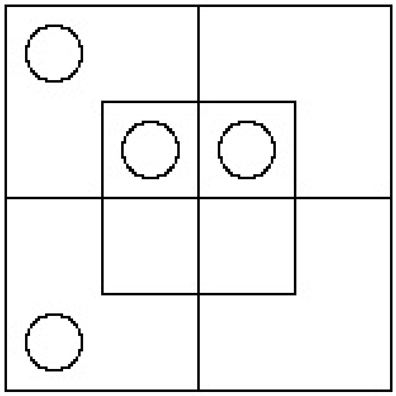

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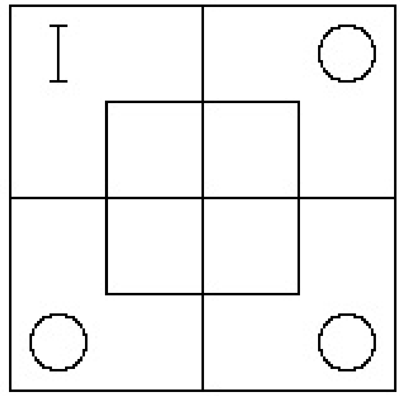

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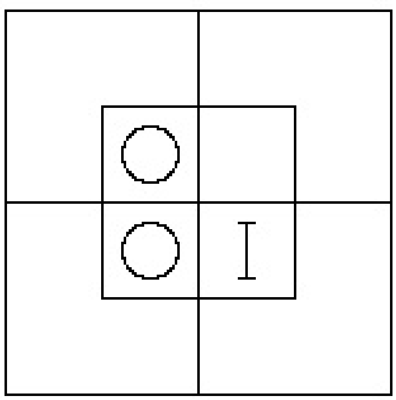

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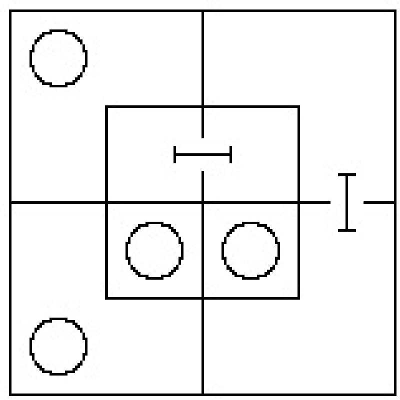

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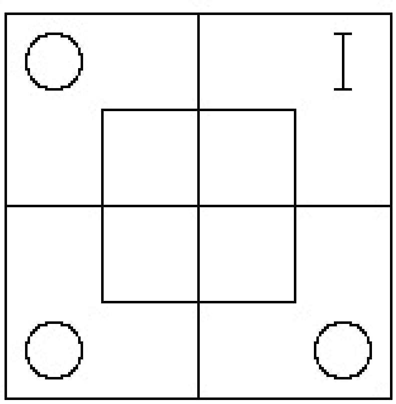

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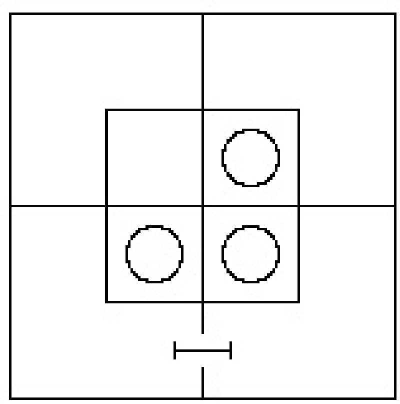

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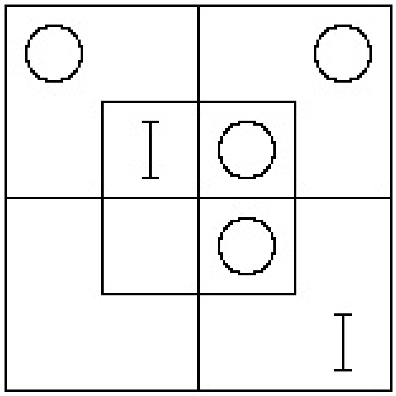

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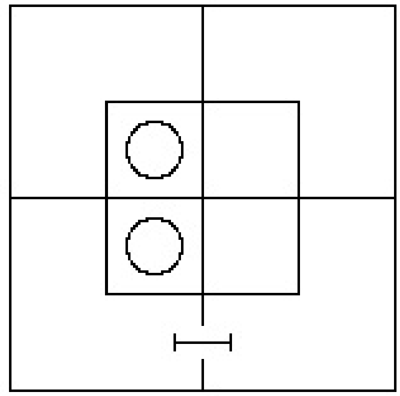

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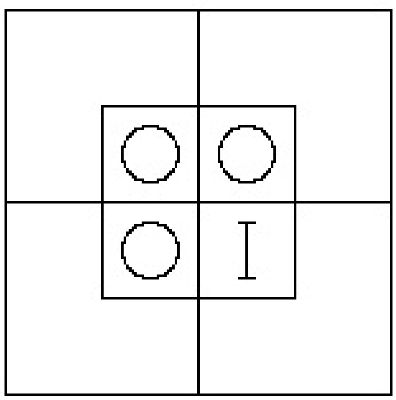

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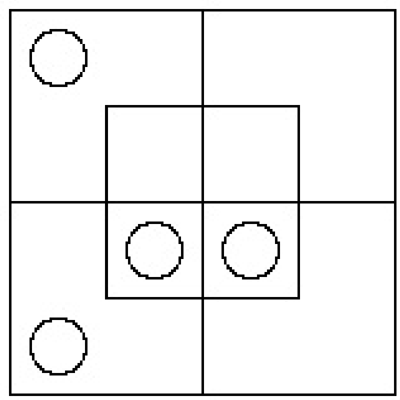

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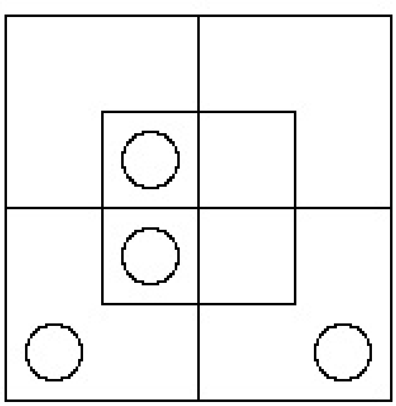

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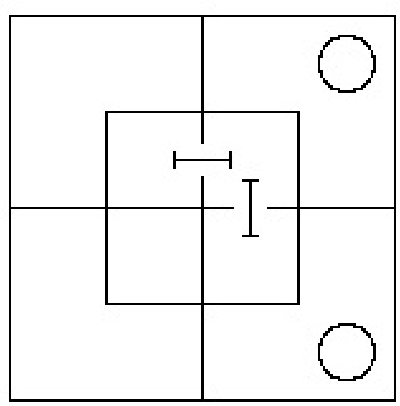

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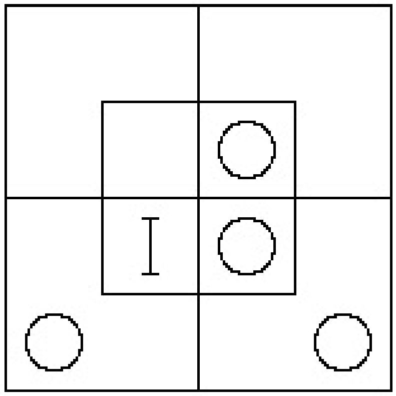

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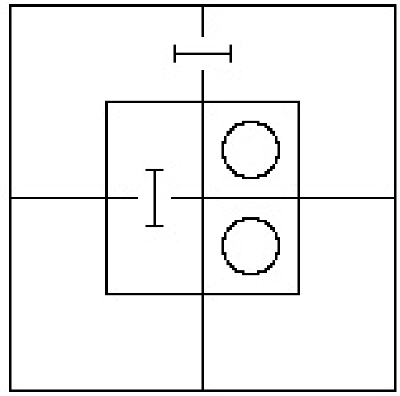

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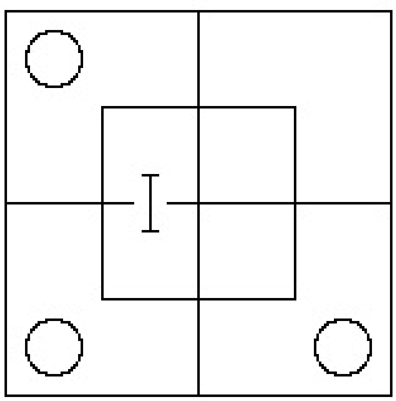

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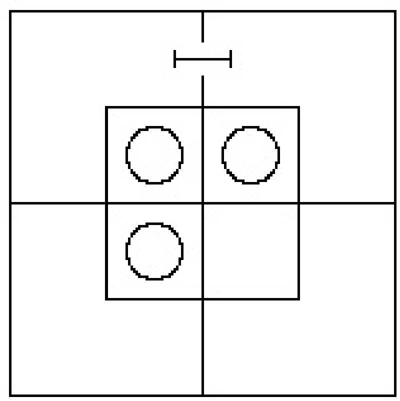

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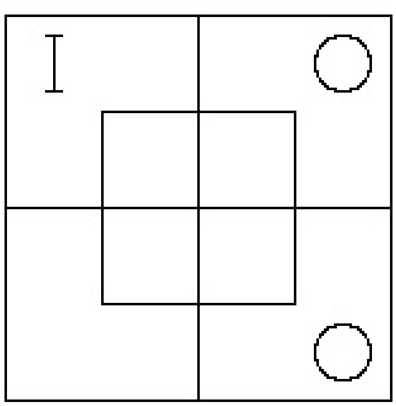

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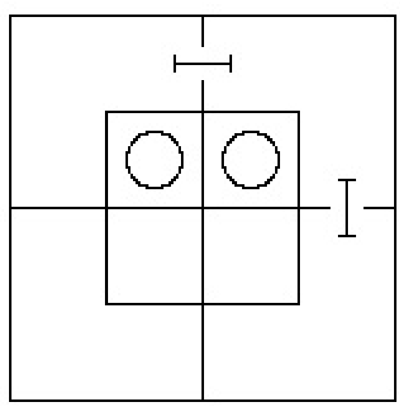

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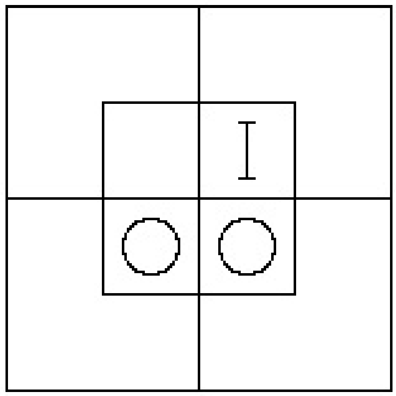

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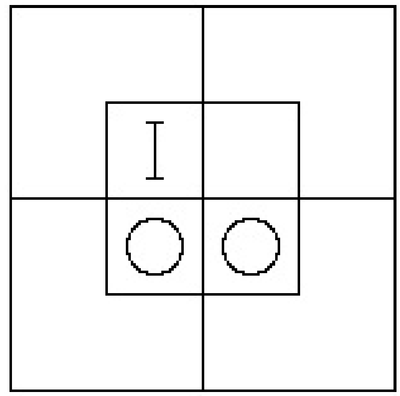

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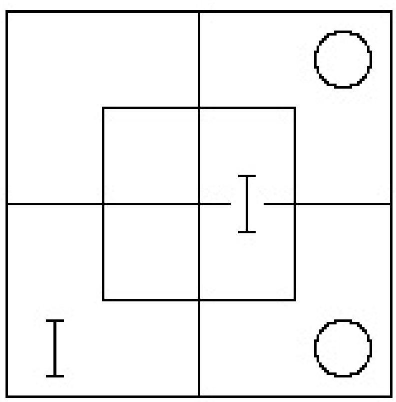

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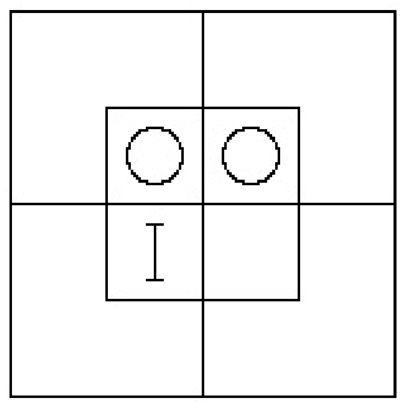

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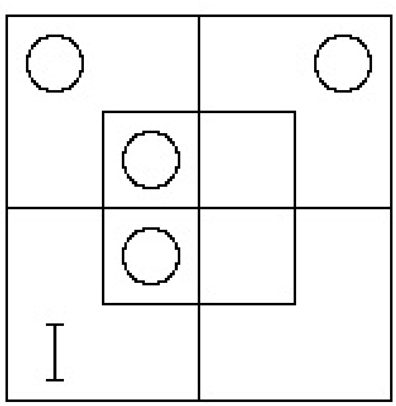

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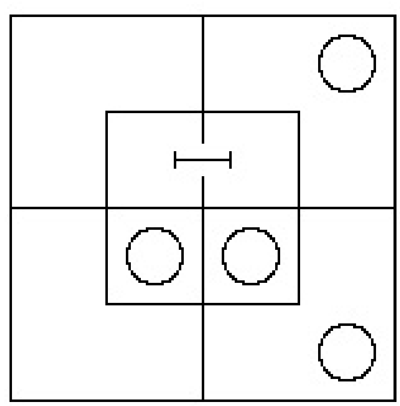

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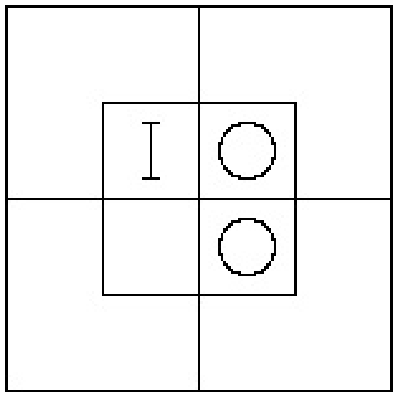

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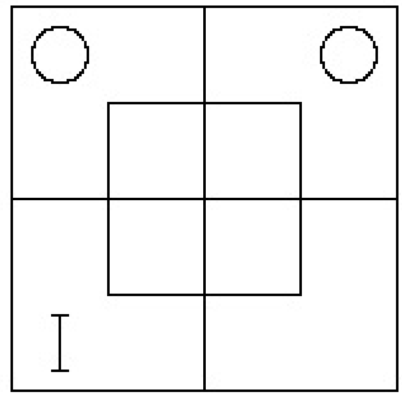

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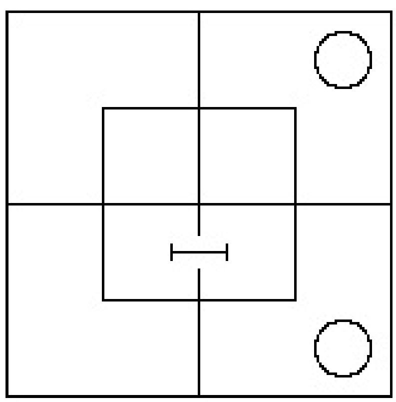

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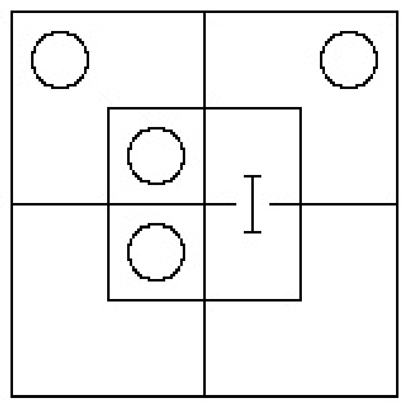

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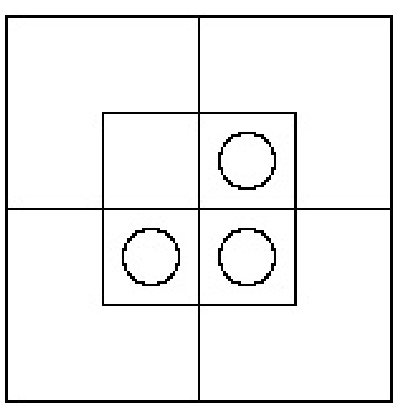

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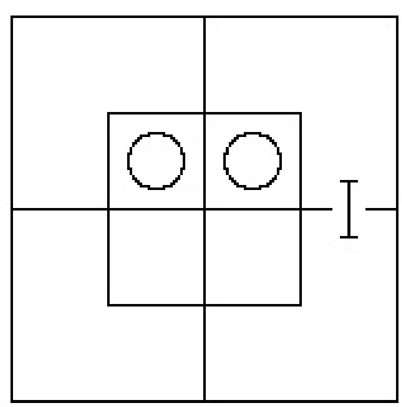

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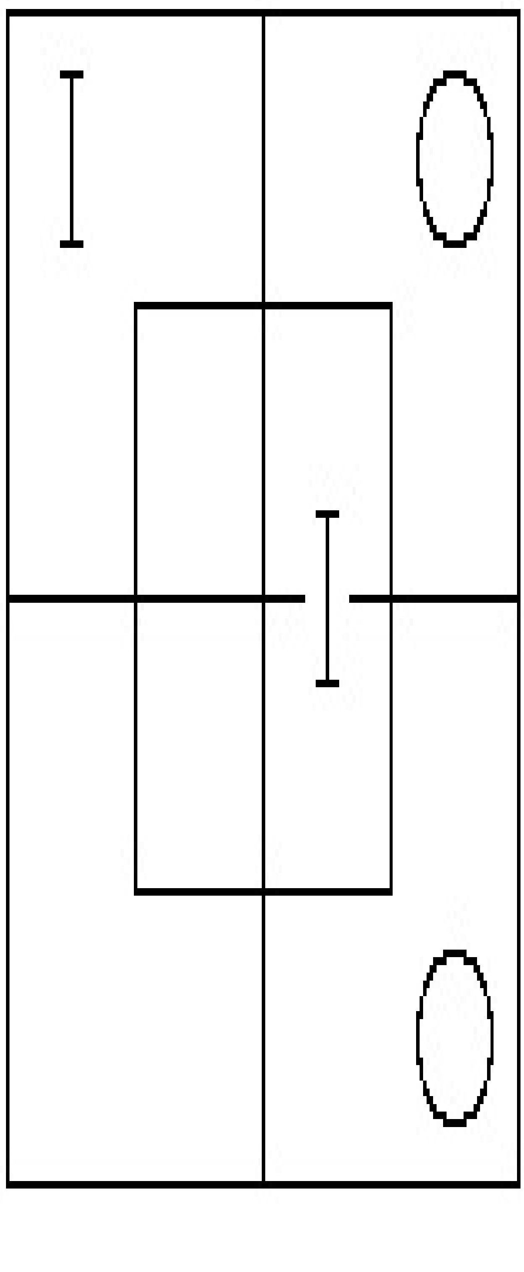

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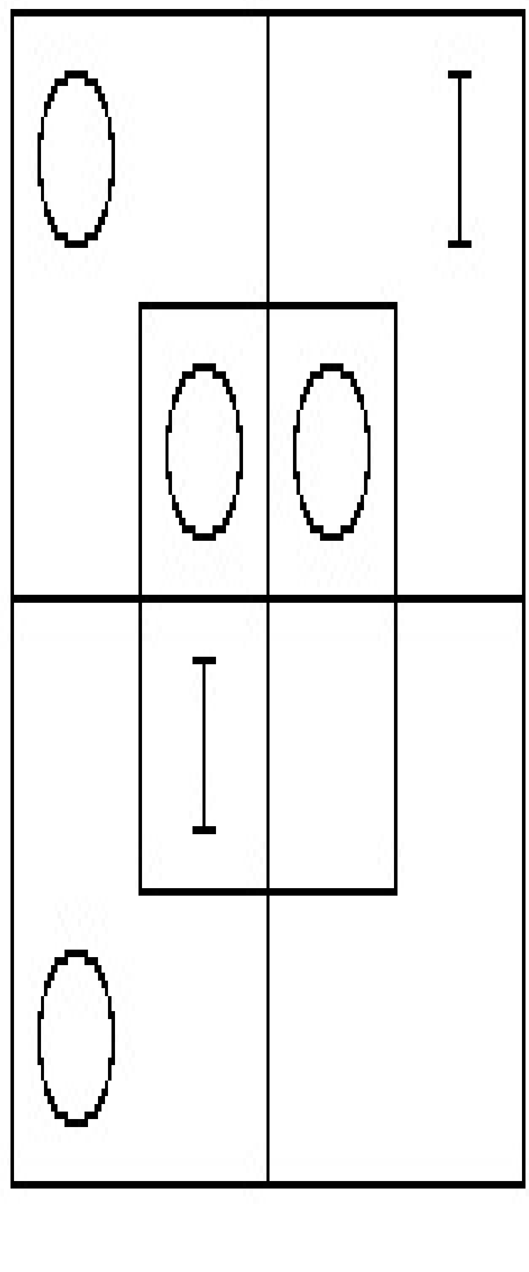


AN3

Answers to § 3.

1. Some xy exist, or some x are y, or some y are x.

2. No information.

3. All y′ are x′.

4. No xy exist, &c.

5. All y′ are x.

6. All x′ are y.

7. All x are y.

8. All x′ are y′, and all y are x.

9. All x′ are y′.

10. All x are y′.

11. No information.

12. Some x′y′ exist, &c.

13. Some xy′ exist, &c.

14. No xy′ exist, &c.

15. Some xy exist, &c.

16. All y are x.

17. All x′ are y, and all y′ are x.

18. All x are y′, and all y are x′.

19. All x are y, and all y′ are x′.

20. All y are x′.

AN4

Answers to § 4.

1. No x′ are y′.

2. Some x′ are y′.

3. Some x are y′.

4. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

5. Some x′ are y′.

6. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

7. Some x are y′.

8. Some x′ are y′.

9. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

10. All x are y, and all y′ are x′.

11. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

12. All y are x′.

13. No x′ are y.

14. No x′ are y′.

15. No x are y.

16. All x are y′, and all y are x′.

17. No x are y′.

18. No x are y.

19. Some x are y′.

20. No x are y′.

21. Some y are x′.

22. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

23. Some x are y.

24. All y are x′.

25. Some y are x′.

26. All y are x.

27. All x are y, and all y′ are x′.

28. Some y are x′.

29. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

30. Some y are x′.

31. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

32. No x are y′.

33. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

34. Some x are y.

35. All y are x′.

36. Some y are x′.

37. Some x are y′.

38. No x are y.

39. Some x′ are y′.

40. All y′ are x.

41. All x are y′.

42. No x are y.

AN5

Answers to § 5.

1. Somebody who has been out for a walk is feeling better.

2. No one but John knows what the letter is about.

3. You and I like walking.

4. Honesty is sometimes the best policy.

5. Some greyhounds are not fat.

6. Some brave persons get their deserts.

7. Some rich persons are not Esquimaux.

8. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

9. John is ill.

10. Some things, that are not umbrellas, should be left behind on a journey.

11. No music is worth paying for, unless it causes vibration in the air.

12. Some holidays are tiresome.

13. Englishmen are not Frenchmen.

14. No photograph of a lady is satisfactory.

15. No one looks poetical unless he is phlegmatic.

16. Some thin persons are not cheerful.

17. Some judges do not exercise self-control.

18. Pigs are not fed on barley-water.

19. Some black rabbits are not old.

20. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

21. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

22. Some lessons need attention.

23. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

24. No one, who forgets a promise, fails to do mischief.

25. Some greedy creatures cannot fly.

26. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

27. No bride-cakes are things that need not be avoided.

28. John is happy.

29. Some people, who are not gamblers, are not philosophers.

30. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

31. None of my lodgers write poetry.

32. Senna is not nice.

33. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

34. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

35. Logic is unintelligible.

36. Some wild creatures are fat.

37. All wasps are unwelcome.

38. All black rabbits are young.

39. Some hard-boiled things can be cracked.

40. No antelopes fail to delight the eye.

41. All well-fed canaries are cheerful.

42. Some poetry is not producible at will.

43. No country infested by dragons fails to be fascinating.

44. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

45. Some picturesque things are not made of sugar.

46. No children can sit still.

47. Some cats cannot whistle.

48. You are terrible.

49. Some oysters are not amusing.

50. Nobody in the house has a beard a yard long.

51. Some ill-fed canaries are unhappy.

52. My sisters cannot sing.

53. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

54. Some rich things are nice.

55. My cousins are none of them judges, and judges are none of them cousins of mine.

56. Something wearisome is not eagerly wished for.

57. Senna is nasty.

58. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

59. Niggers are not any of them tall.

60. Some obstinate persons are not philosophers.

61. John is happy.

62. Some unwholesome dishes are not present here (i.e. cannot be spoken of as "these").

63. No books suit feverish patients unless they make one drowsy.

64. Some greedy creatures cannot fly.

65. You and I can detect a sharper.

66. Some dreams are not lambs.

67. No lizard needs a hairbrush.

68. Some things, that may escape notice, are not battles.

69. My cousins are not any of them judges.

70. Some hard-boiled things can be cracked.

71. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

72. She is unpopular.

73. Some people, who wear wigs, are not children of yours.

74. No lobsters expect impossibilities.

75. No nightmare is eagerly desired.

76. Some nice things are not plumcakes.

77. Some kinds of jam need not be shunned.

78. All ducks are ungraceful.

79. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

80. No man, who begs in the street, should fail to keep accounts.

81. Some savage creatures are not spiders.

82. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

83. No travelers, who do not carry plenty of small change, fail to lose their

luggage.

84. [No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.]

85. Judges are none of them cousins of mine.

86. All my lodgers are sane.

87. Those who are busy are contented, and discontented people are not busy.

88. None of my cousins are judges.

89. No nightingale dislikes sugar.

90. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

91. Some excuses are not clear explanations.

92. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

93. No kind deed need cause scruple.

94. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

95. [No Concl. Fallacy of Like Eliminands not asserted to exist.]

96. No cheats are trustworthy.

97. No clever child of mine is greedy.

98. Some things, that are meant to amuse, are not Acts of Parliament.

99. No tour, that is ever forgotten, is worth writing a book about.

100. No obedient child of mine is contented.

101. Your visit does not annoy me.

AN6

Answers to § 6.

1. Conclusion right.

2. No Concl. Fallacy of Like Eliminands not asserted to exist.

3. Concl. right.

4. Concl. right.

5. Concl. right.

6. No Concl. Fallacy of Like Eliminands not asserted to exist.

7. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

8. Concl. right.

9. Concl. right.

10. Concl. right.

11. Concl. right.

12. Concl. right.

13. Concl. right.

14. Concl. right.

15. Concl. right.

16. No Concl. Fallacy of Like Eliminands not asserted to exist.

17. Concl. right.

18. Concl. right.

19. Concl. right.

20. Concl. right.

21. Concl. right.

22. Concl. wrong: the right one is “Some x are y.”

23. Concl. right.

24. Concl. right.

25. Concl. right.

26. Concl. right.

27. Concl. right.

28. No Concl. Fallacy of Like Eliminands not asserted to exist.

29. Concl. right.

30. Concl. right.

31. Concl. right.

32. Concl. right.

33. Concl. right.

34. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

35. Concl. right.

36. Concl. right.

37. Concl. right.

38. No Concl. Fallacy of Like Eliminands not asserted to exist.

39. Concl. right.

40. Concl. right.

AN7

Answers to § 7.

1. Concl. right.

2. Concl. right.

3. Concl. right.

4. Concl. wrong: right one is “Some epicures are not uncles of mine.”

5. Concl. right.

6. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

7. Concl. wrong: right one is “The publication, in which I saw it, tells lies.”

8. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

9. Concl. wrong: right one is “Some tedious songs are not his.”

10. Concl. right.

11. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

12. Concl. wrong: right one is “Some fierce creatures do not drink coffee.”

13. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

14. Concl. right.

15. Concl. wrong: right one is “Some shallow persons are not students.”

16. No Concl. Fallacy of Like Eliminands not asserted to exist.

17. Concl. wrong: right one is “Some business, other than railways, is unprofitable.”

18. Concl. wrong: right one is “Some vain persons are not Professors.”

19. Concl. right.

20. Concl. wrong: right one is “Wasps are not puppies.”

21. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

22. No Concl. Same Fallacy.

23. Concl. right.

24. Concl. wrong: right one is “Some chocolate-creams are delicious.”

25. No Concl. Fallacy of Like Eliminands not asserted to exist.

26. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

27. Concl. wrong: right one is “Some pillows are not pokers.”

28. Concl. right.

29. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

30. No Concl. Fallacy of Like Eliminands not asserted to exist.

31. Concl. right.

32. No Concl. Fallacy of Like Eliminands not asserted to exist.

33. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

34. Concl. wrong: right one is “Some dreaded persons are not begged to prolong their visits.”

35. Concl. wrong: right one is “No man walks on neither.”

36. Concl. right.

37. No Concl. Fallacy of Unlike Eliminands with an Entity-Premiss.

38. Concl. wrong: right one is “Some persons, dreaded by children, are not emperors.”

39. Concl. incomplete: the omitted portion is “Sugar is not salt.”

40. Concl. right.

AN8

Answers to § 8.

1. a1b0 † b1a0.

2. d1a0.

3. ac0.

4. a1d0.

5. cd0.

6. d1c0.

7. a′c0.

8. c1a′0.

9. c′d0.

10. b1a0.

11. d1b0.

12. a′d0.

13. e1b0.

14. d1e′0.

15. e1a′0.

16. b′c0.

17. a1b0.

18. d1c0.

19. a1d0.

20. ac0.

21. de0.

22. a1b′0.

23. h1c0.

24. e1a0.

25. e1c′0.

26. e1c′0.

27. hk′0.

28. e1d′0.

29. l′a0.

30. k1b′0.

AN9

Answers to § 9.

1. Babies cannot manage crocodiles.

2. Your presents to me are not made of tin.

3. All my potatoes in this dish are old ones.

4. My servants never say “shpoonj.”

5. My poultry are not officers.

6. None of your sons are fit to serve on a jury.

7. No pencils of mine are sugar-plums.

8. Jenkins is inexperienced.

9. No comet has a curly tail.

10. No hedge-hog takes in the Times.

11. This dish is unwholesome.

12. My gardener is very old.

13. All humming-birds are small.

14. No one with a hooked nose ever fails to make money.

15. No gray ducks in this village wear lace collars.

16. No jug in this cupboard will hold water.

17. These apples were grown in the sun.

18. Puppies, that will not lie still, never care to do worsted work.

19. No name in this list is unmelodious.

20. No M.P. should ride in a donkey-race, unless he has perfect self-command.

21. No goods in this shop, that are still on sale, may be carried away.

22. No acrobatic feat, which involves turning a quadruple somersault, is ever

attempted in a circus.

23. Guinea-pigs never really appreciate Beethoven.

24. No scentless flowers please me.

25. Showy talkers are not really well-informed.

26. None but red-haired boys learn Greek in this school.

27. Wedding-cake always disagrees with me.

28. Discussions, that go on while Tomkins is in the chair, endanger the peacefulness of our Debating-Club.

29. All gluttons, who are children of mine, are unhealthy.

30. An egg of the Great Auk is not to be had for a song.

31. No books sold here have gilt edges, unless they are priced at 5s. and upwards.

32. When you cut your finger, you will find Tincture of Calendula useful.

33. I have never come across a mermaid at sea.

34. All the romances in this library are well-written.

35. No bird in this aviary lives on mince-pies.

36. No plum-pudding, that has not been boiled in a cloth, can be distinguished from soup.

37. All your poems are uninteresting.

38. None of my peaches have been grown in a hot-house.

39. No pawnbroker is dishonest.

40. No kitten with green eyes will play with a gorilla.

41. All my friends dine at the lower table.

42. My writing-desk is full of live scorpions.

43. No Mandarin ever reads Hogg’s poems.

44. Shakespeare was clever.

45. Rainbows are not worth writing odes to.

46. These Sorites-examples are difficult.

47. All my dreams come true.

48. All the English pictures here are painted in oils.

49. Donkeys are not easy to swallow.

50. Opium-eaters never wear white kid gloves.

51. A good husband always comes home for his tea.

52. Bathing-machines are never made of mother-of-pearl.

53. Rainy days are always cloudy.

54. No heavy fish is unkind to children.

55. No engine-driver lives on barley-sugar.

56. All the animals in the yard gnaw bones.

57. No badger can guess a conundrum.

58. No cheque of yours, received by me, is payable to order.

59. I cannot read any of Brown’s letters.

60. I always avoid a kangaroo.

CHAPTER III.

SOLUTIONS.

Table of Contents

§ 1.

Propositions of Relation reduced to normal form.

SL1

Solutions for § 1.

1. The Univ. is “persons.” The Individual “I” may be regarded as a Class, of persons, whose peculiar Attribute is “represented by the Name ‘I’”, and may be called the Class of “I’s”. It is evident that this Class cannot possibly contain more than one Member: hence the Sign of Quantity is “all”. The verb “have been” may be replaced by the phrase “are persons who have been”. The Proposition may be written thus:—

“All” “I’s” “are” “persons who have been out for a walk”	Sign of Quantity

or, more briefly,

“All | I’s | are | persons who have been out for a walk”.

2. The Univ. and the Subject are the same as in Ex. 1. The Proposition may be written “All | I’s | are | persons who feel better”.

3. Univ. is “persons”. The Subject is evidently the Class of persons from which John is excluded; i.e. it is the Class containing all persons who are not “John”.

The Sign of Quantity is “no”.

The verb “has read” may be replaced by the phrase “are persons who have read”.

The Proposition may be written

“No | persons who are not ‘John’ | are | persons who have read the letter”.

4. Univ. is “persons”. The Subject is evidently the Class of persons whose only two Members are “you and I”.

Hence the Sign of Quantity is “no”.

The Proposition may be written

“No | Members of the Class ‘you and I’ | are | old persons”.

5. Univ. is “creatures”. The verb “run well” may be replaced by the phrase “are creatures that run well”.

The Proposition may be written

“No | fat creatures | are | creatures that run well”.

6. Univ. is “persons”. The Subject is evidently the Class of persons who are not brave.

The verb “deserve” may be replaced by the phrase “are deserving of”.

The Proposition may be written

“No | not-brave persons | are | persons deserving of the fair”.

7. Univ. is “persons”. The phrase “looks poetical” evidently belongs to the Predicate; and the Subject is the Class, of persons, whose peculiar Attribute is “not-pale”.

The Proposition may be written

“No | not-pale persons | are | persons who look poetical”.

8. Univ. is “persons”.

The Proposition may be written

“Some | judges | are | persons who lose their tempers”.

9. Univ. is “persons”. The phrase “never neglect” is merely a stronger form of the phrase “am a person who does not neglect”.

The Proposition may be written

“All | ‘I’s’ | are | persons who do not neglect important business”.

10. Univ. is “things”. The phrase “what is difficult” (i.e. “that which is difficult”) is equivalent to the phrase “all difficult things”.

The Proposition may be written

“All | difficult things | are | things that need attention”.

11. Univ. is “things”. The phrase “what is unwholesome” may be interpreted as in Ex. 10.

The Proposition may be written

“All | unwholesome things | are | things that should be avoided”.

12. Univ. is “laws”. The Predicate is evidently a Class whose peculiar Attribute is “relating to excise”.

The Proposition may be written

“All | laws passed last week | are | laws relating to excise”.

13. Univ. is “things”. The Subject is evidently the Class, of studies, whose peculiar Attribute is “logical”; hence the Sign of Quantity is “all”.

The Proposition may be written

“All | logical studies | are | things that puzzle me”.

14. Univ. is “persons”. The Subject is evidently “persons in the house”.

The Proposition may be written

“No | persons in the house | are | Jews”.

15. Univ. is “dishes”. The phrase “if not well-cooked” is equivalent to the Attribute “not well-cooked”.

The Proposition may be written

“Some | not well-cooked dishes | are | unwholesome dishes”.

16. Univ. is “books”. The phrase “make one drowsy” may be replaced by the phrase “are books that make one drowsy”.

The Sign of Quantity is evidently “all”.

The Proposition may be written

“All | unexciting books | are | books that make one drowsy”.

17. Univ. is “men”. The Subject is evidently “a man who knows what he’s about”; and the word “when” shows that the Proposition is asserted of every such man, i.e. of all such men. The verb “can” may be replaced by “are men who can”.

The Proposition may be written

“All | men who know what they’re about | are | men who can detect a sharper”.

18. The Univ. and the Subject are the same as in Ex. 4.

The Proposition may be written

“All | Members of the Class ‘you and I’ | are | persons who know what they’re about”.

19. Univ. is “persons”. The verb “wear” may be replaced by the phrase “are accustomed to wear”.

The Proposition may be written

“Some | bald persons | are | persons accustomed to wear wigs”.

20. Univ. is “persons”. The phrase “never talk” is merely a stronger form of “are persons who do not talk”.

The Proposition may be written

“All | fully occupied persons | are | persons who do not talk about their grievances”.

21. Univ. is “riddles”. The phrase “if they can be solved” is equivalent to the Attribute “that can be solved”.

The Proposition may be written

“No | riddles that can be solved | are | riddles that interest me”.

§ 2.

Method of Diagrams.

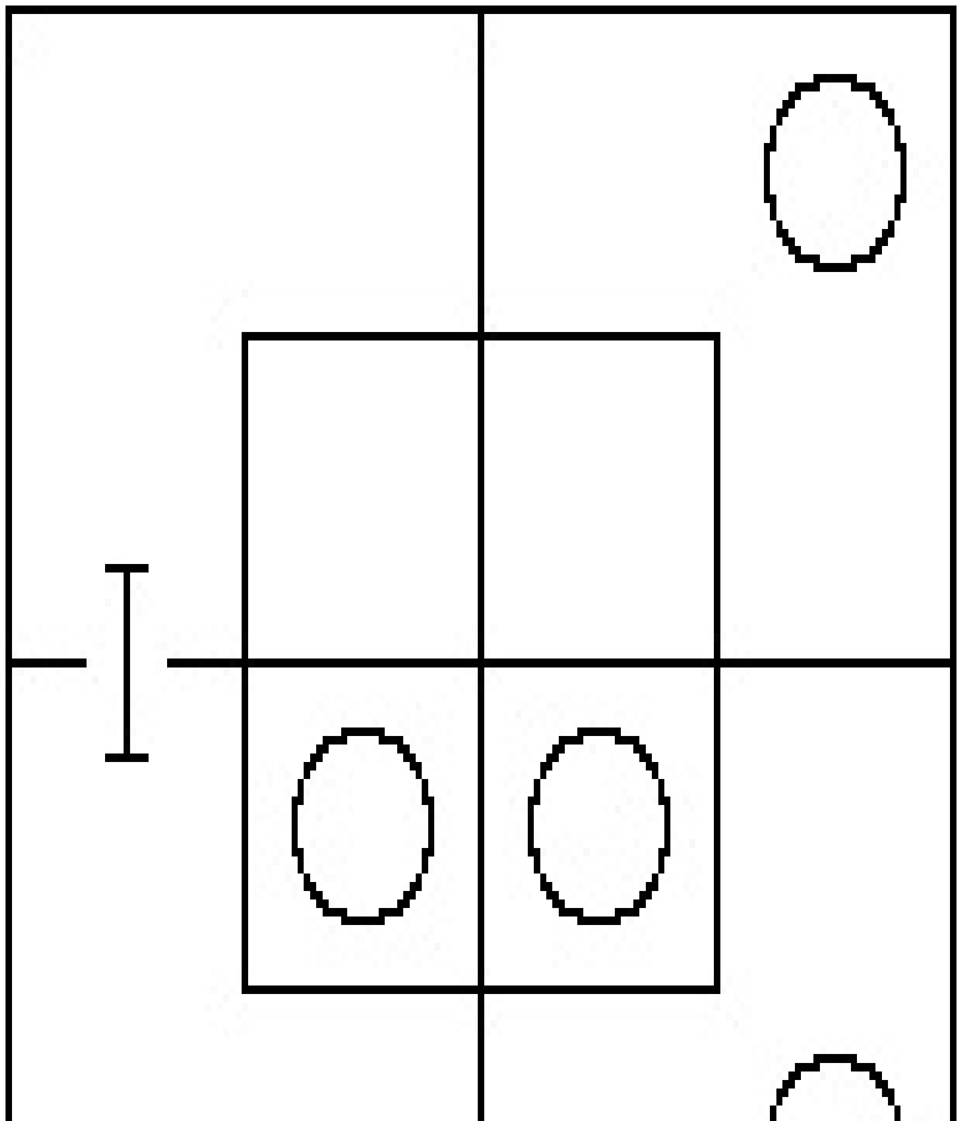
SL4-A

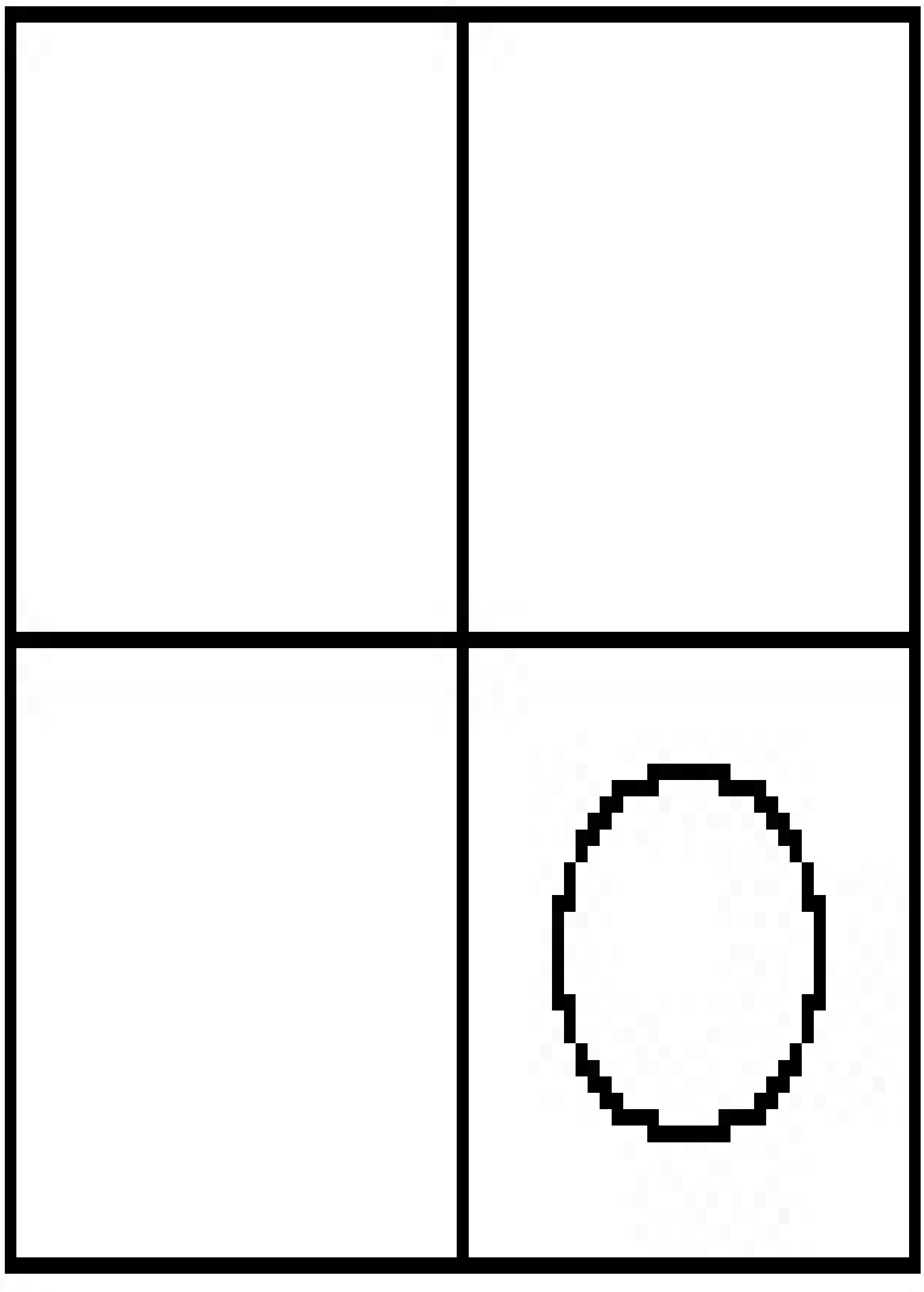
Solutions for § 4, Nos. 1–12.

1.

No m are x′;

All m′ are y.



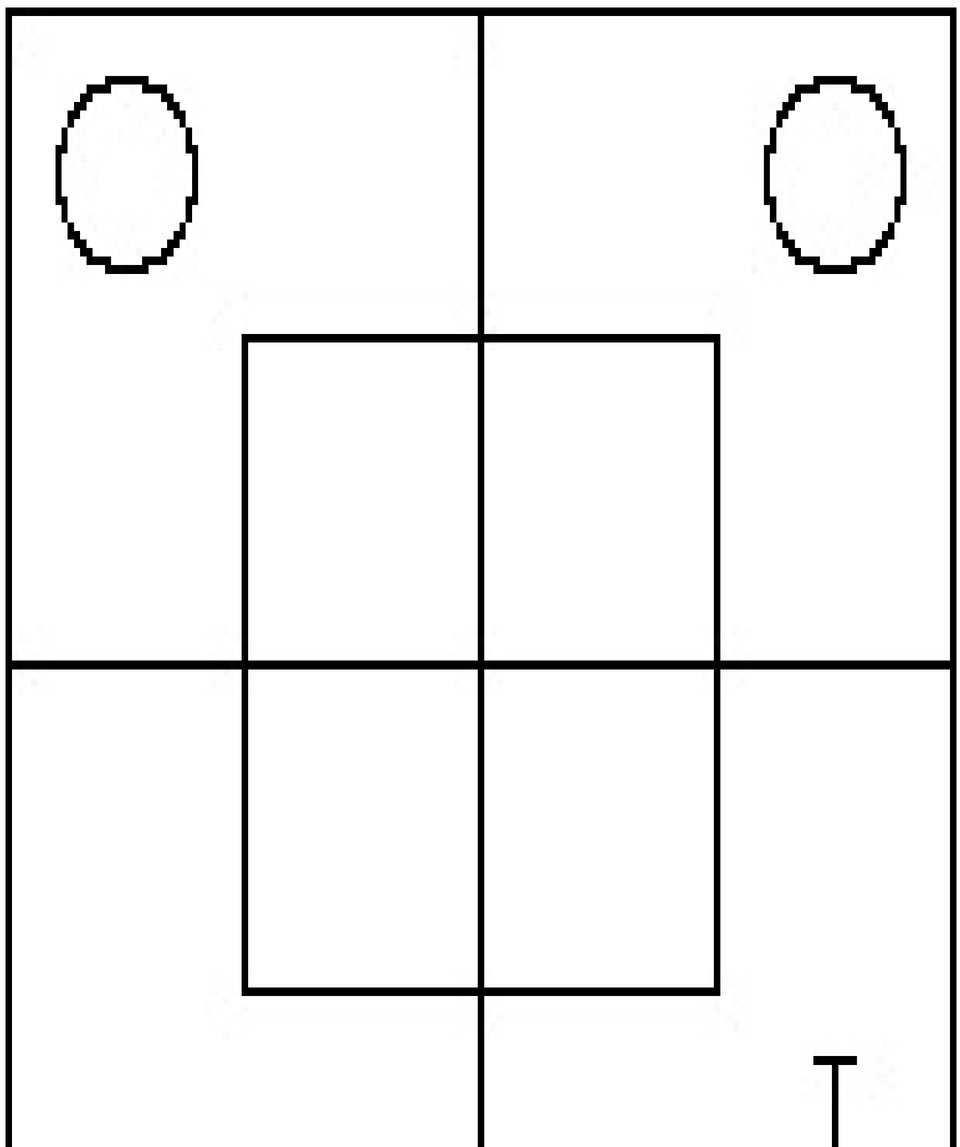


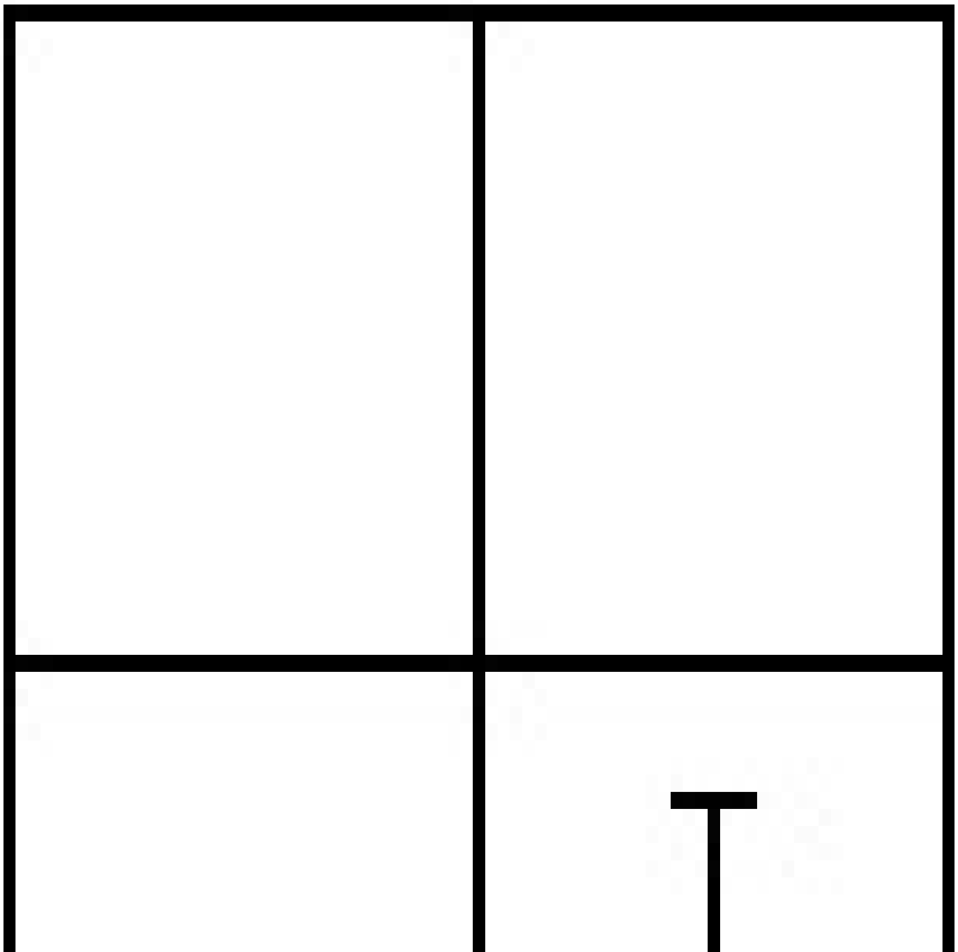
∴ No x′ are y′.

2.

No m′ are x;

Some m′ are y′.



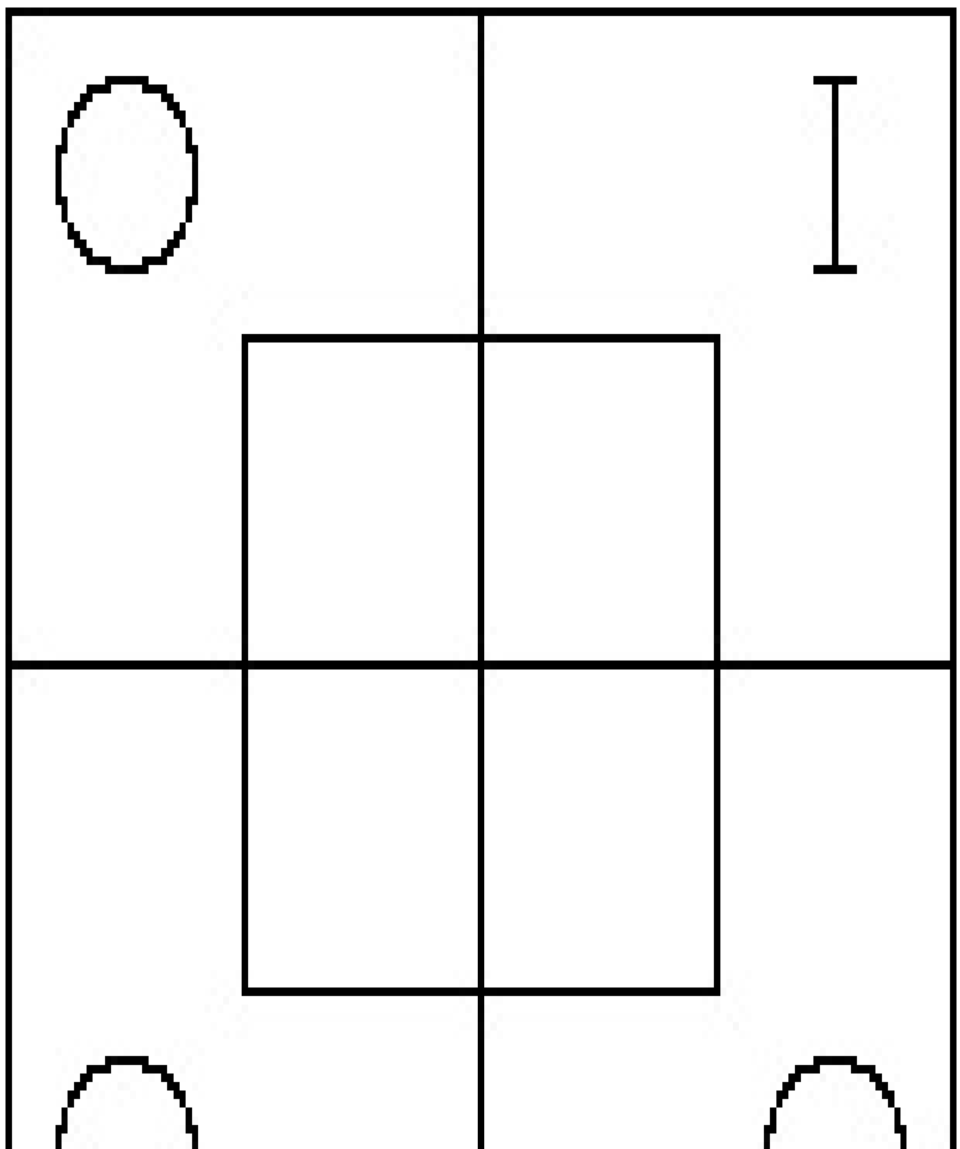


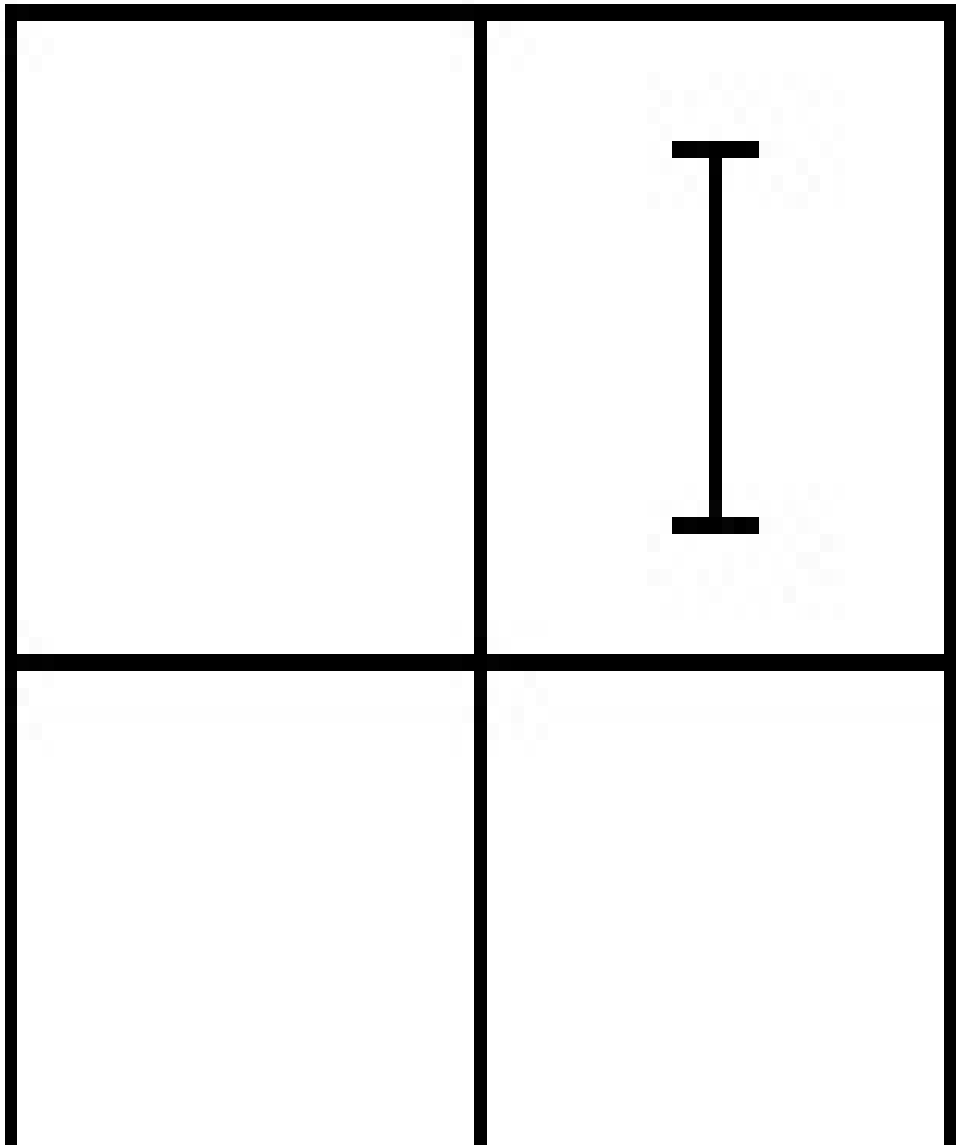
∴ Some x are y′.

3.

All m′ are x;

All m′ are y′.



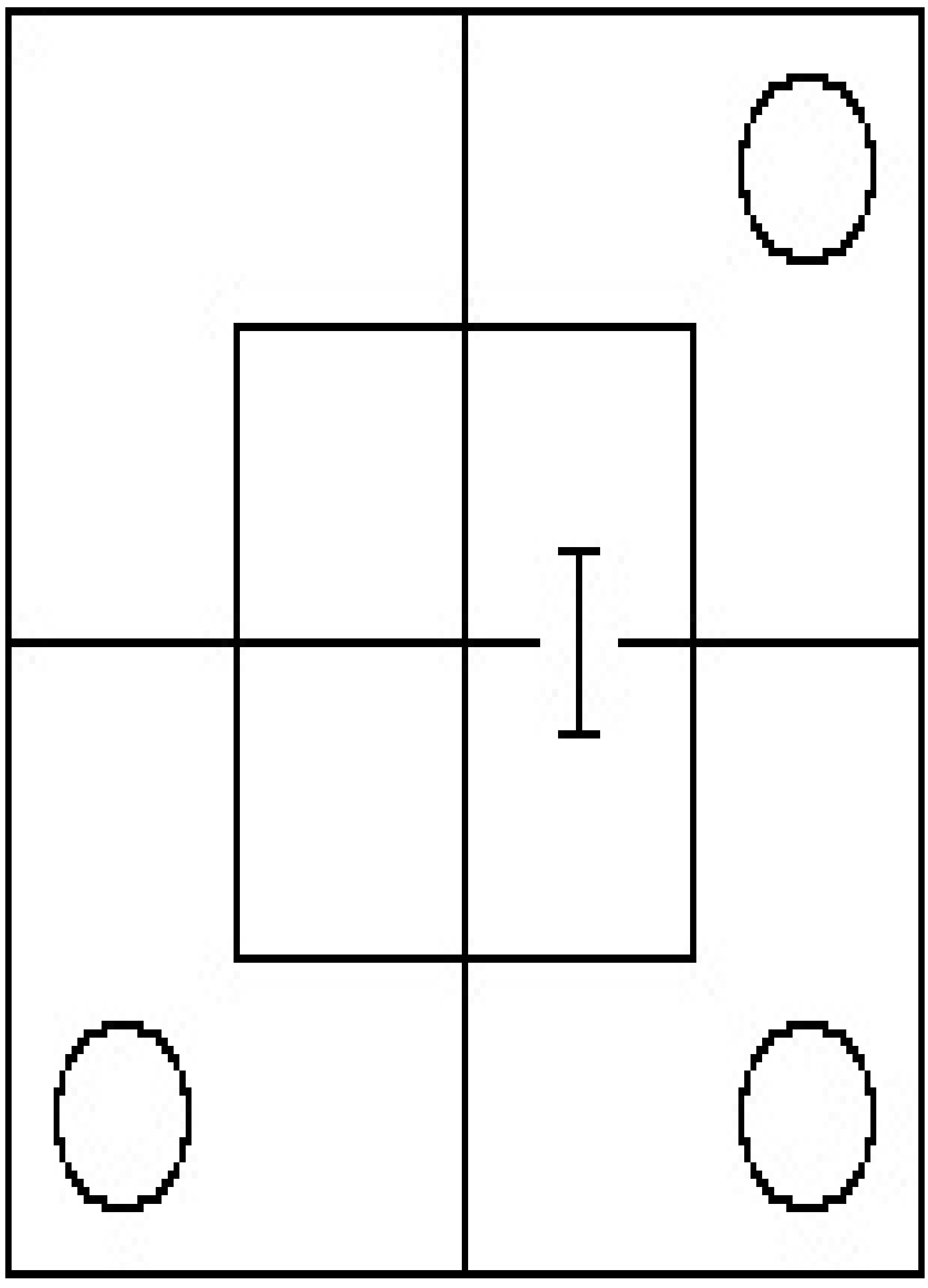


∴ Some x are y′.

4.

No x′ are m′;

All y′ are m.

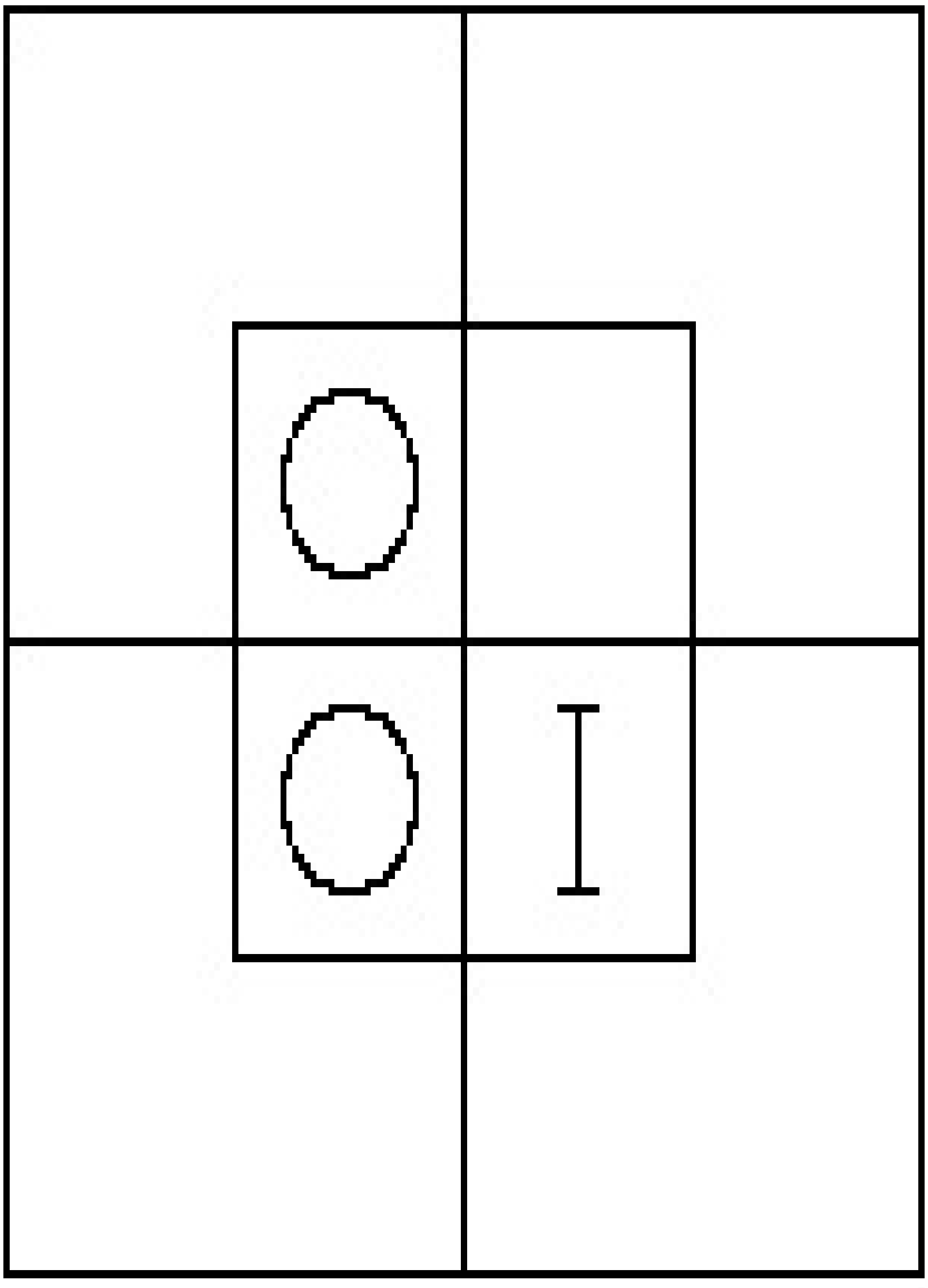


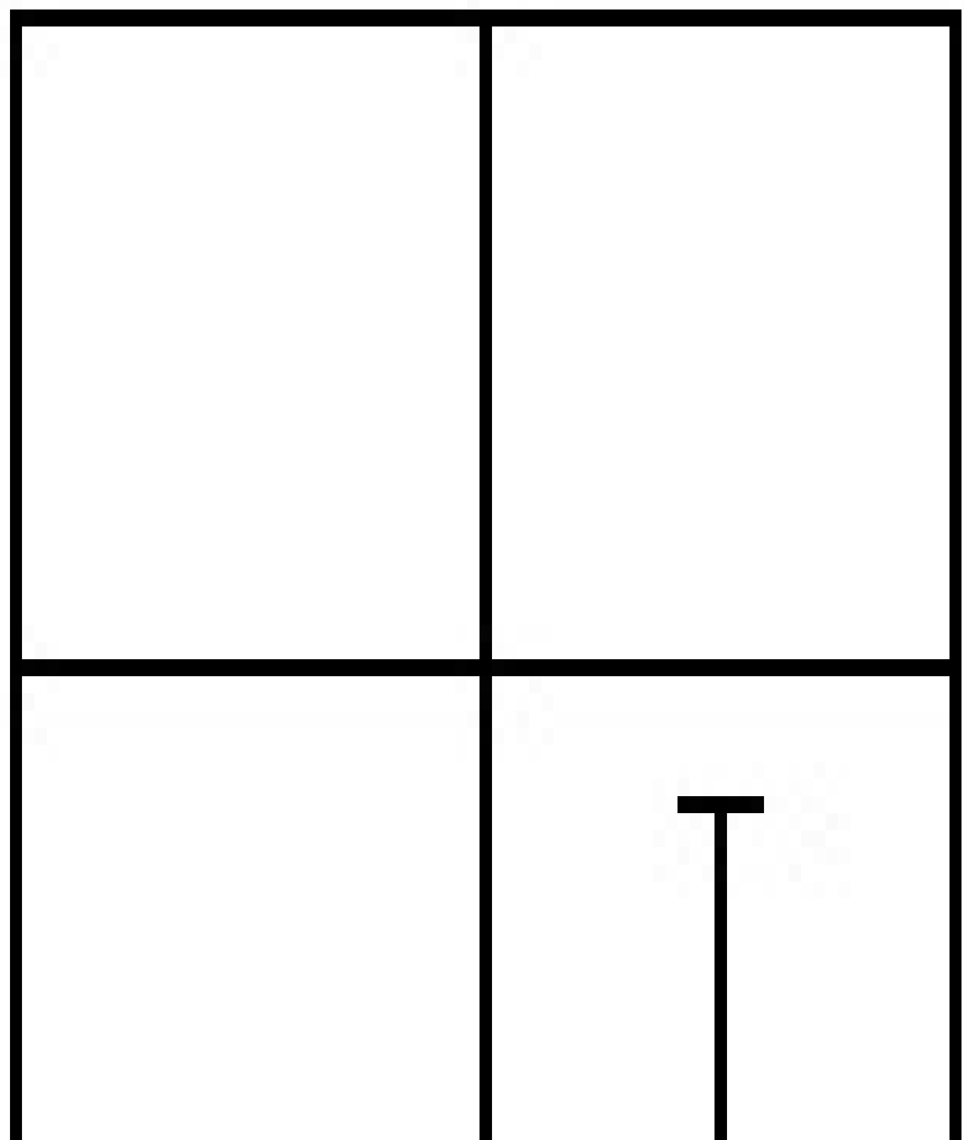
There is no Conclusion.

5.

Some m are x′;

No y are m.



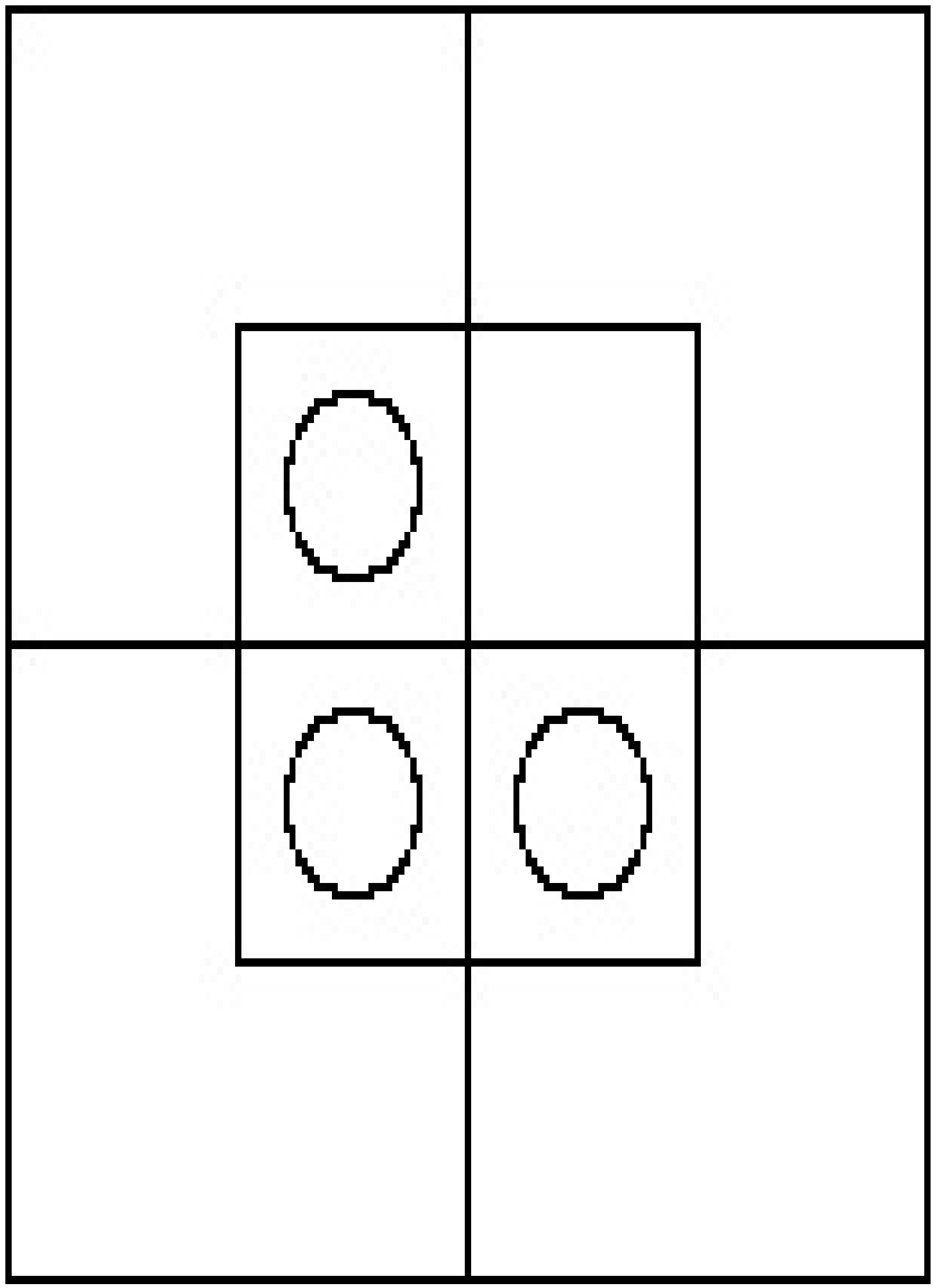


∴ Some x' are y'.

6.

No x' are m;

No m are y.

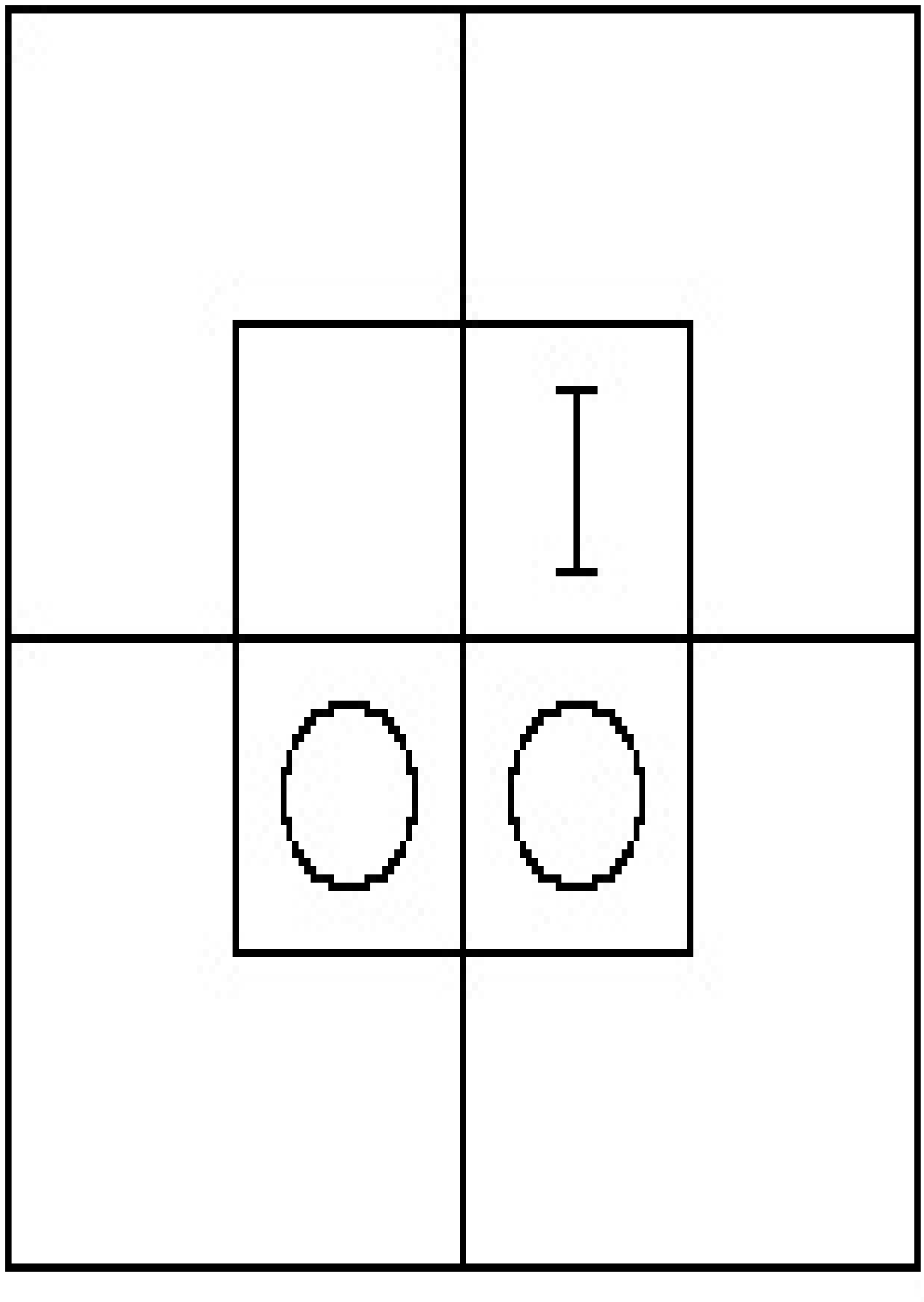


There is no Conclusion.

7.

No m are x′;

Some y′ are m.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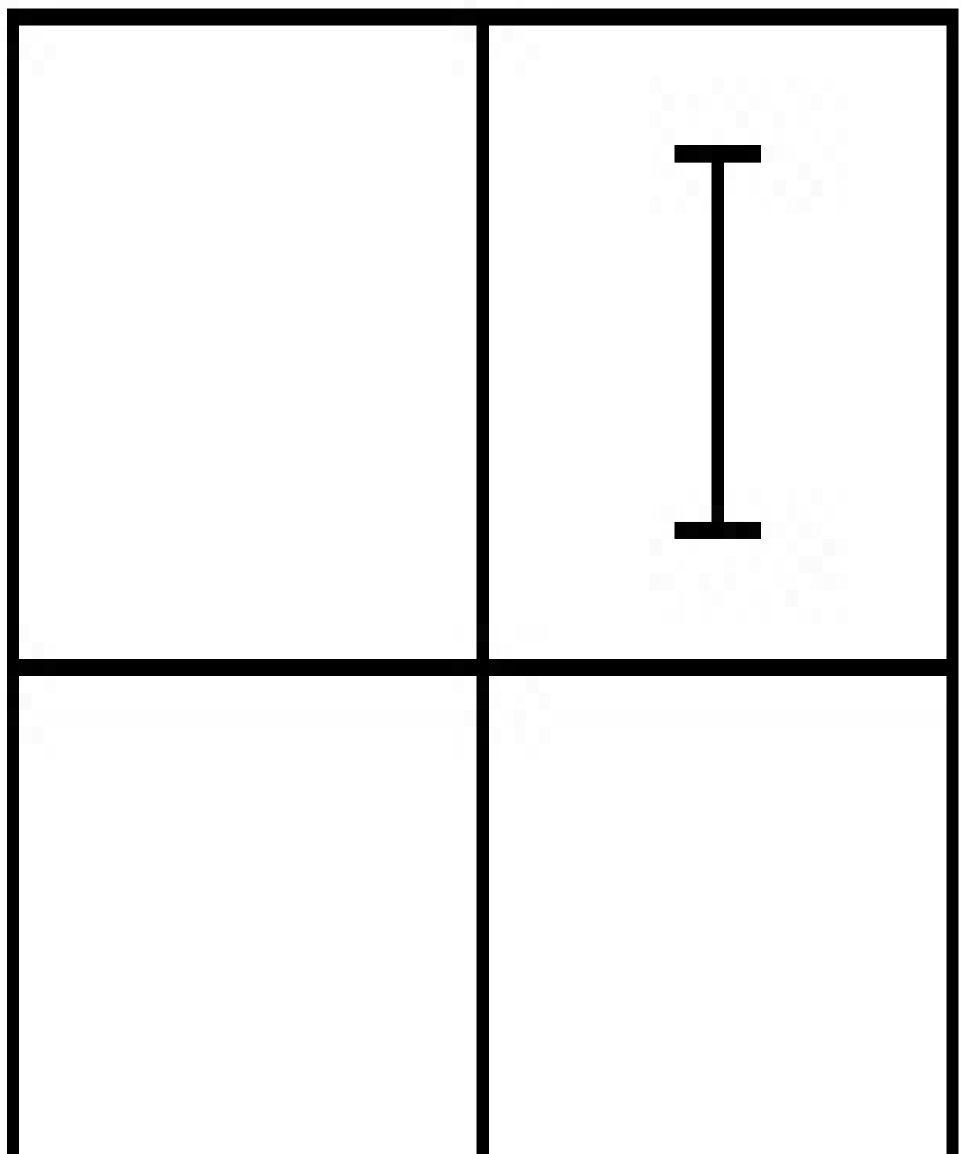
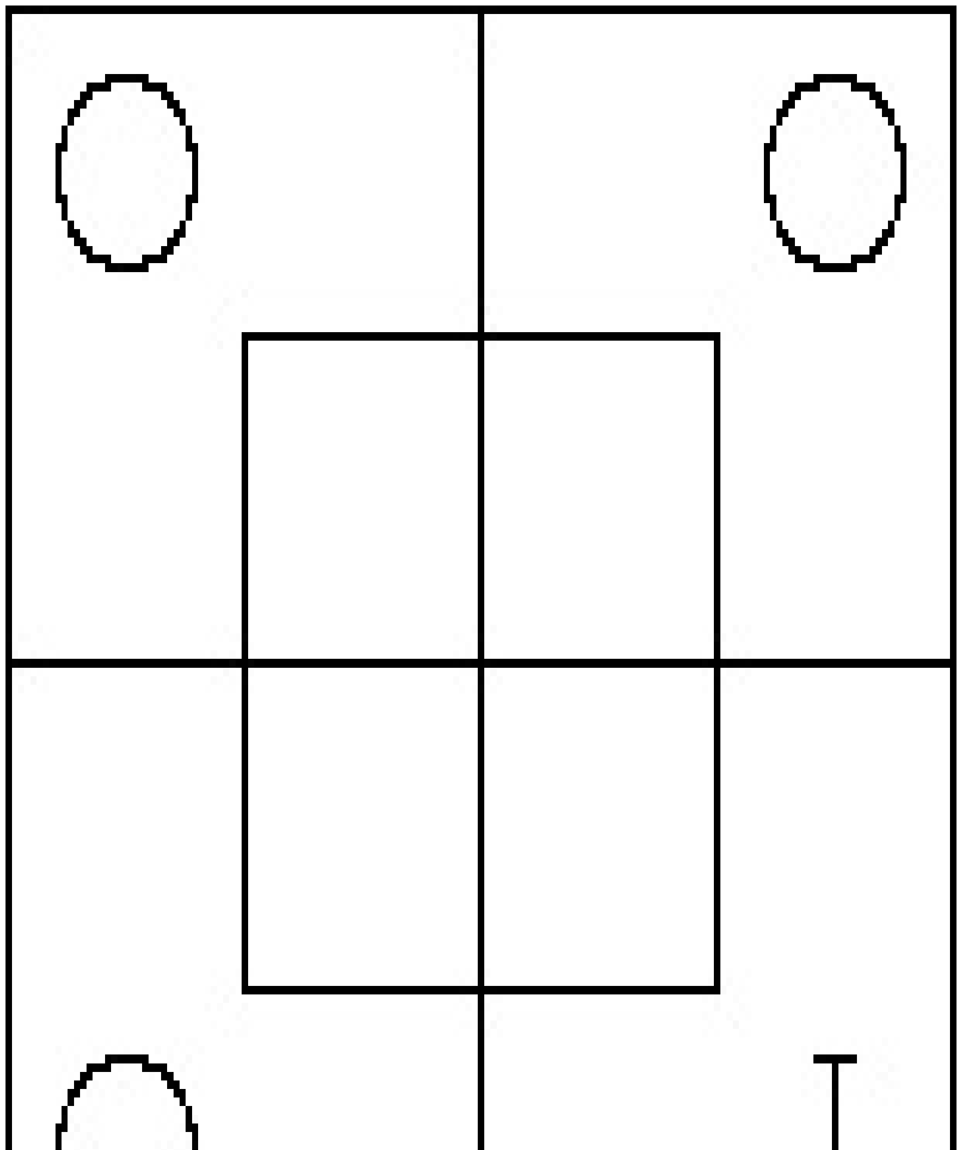


∴ Some x are y′.

8.

All m′ are x′;

No m′ are y.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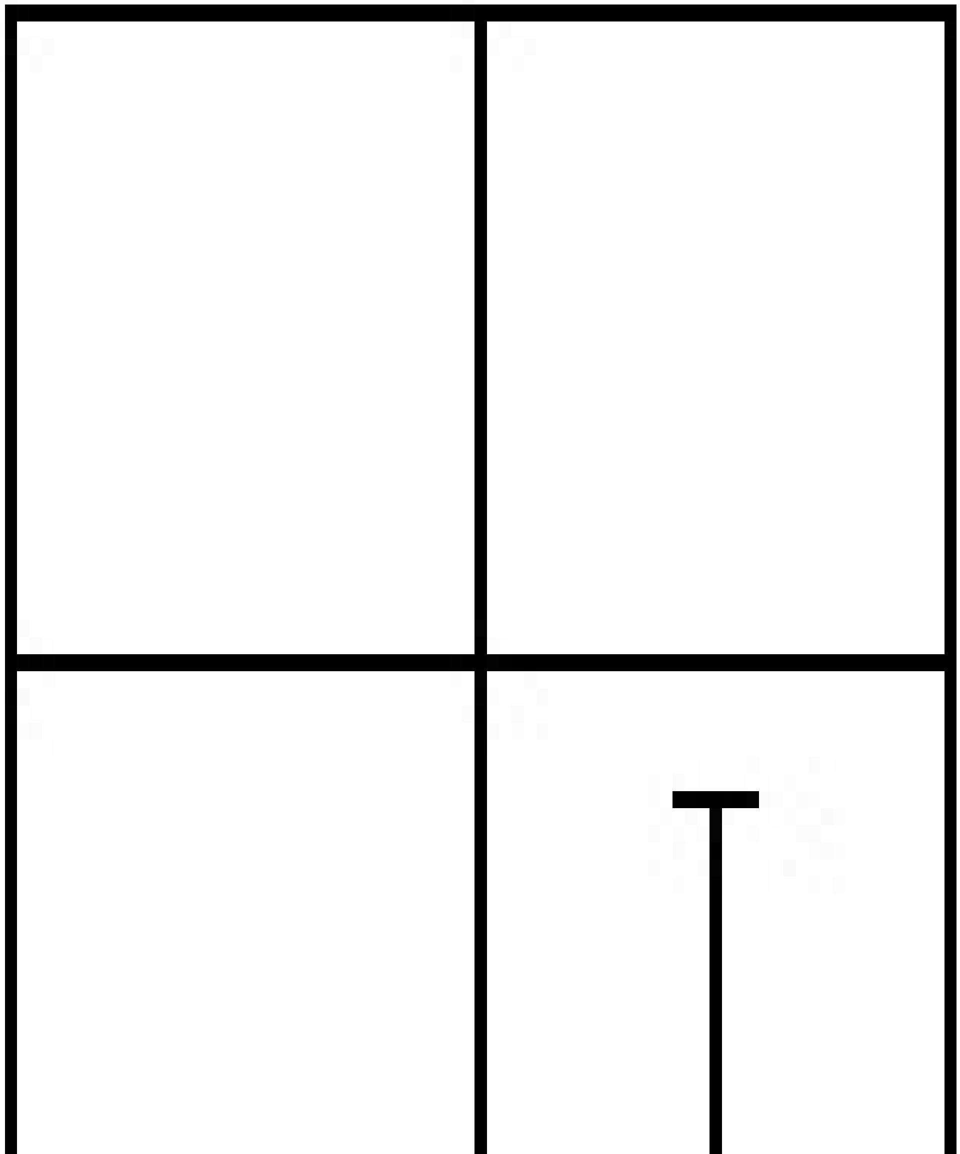
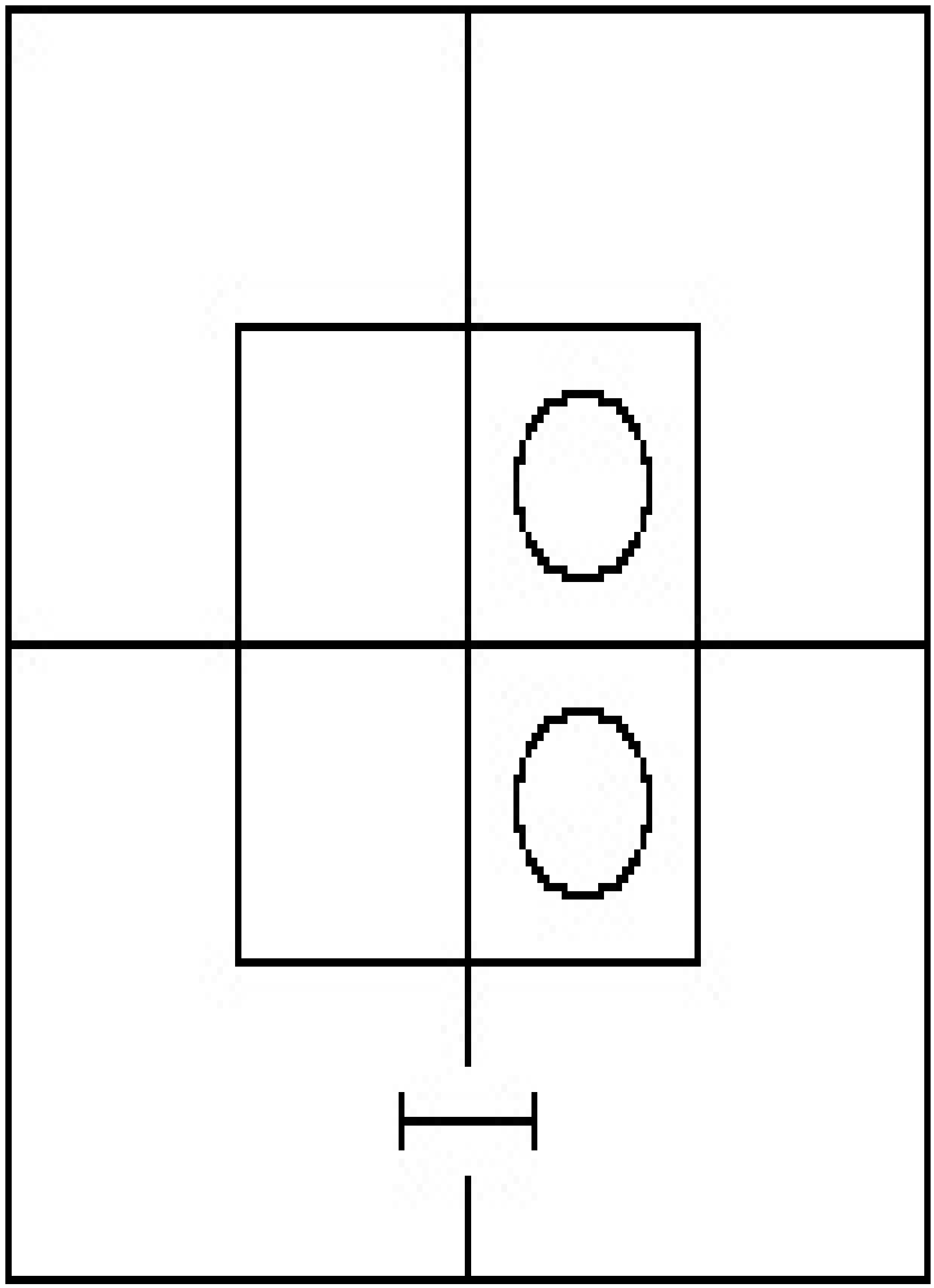


∴ Some x′ are y′.

9.

Some x′ are m′;

No m are y′.

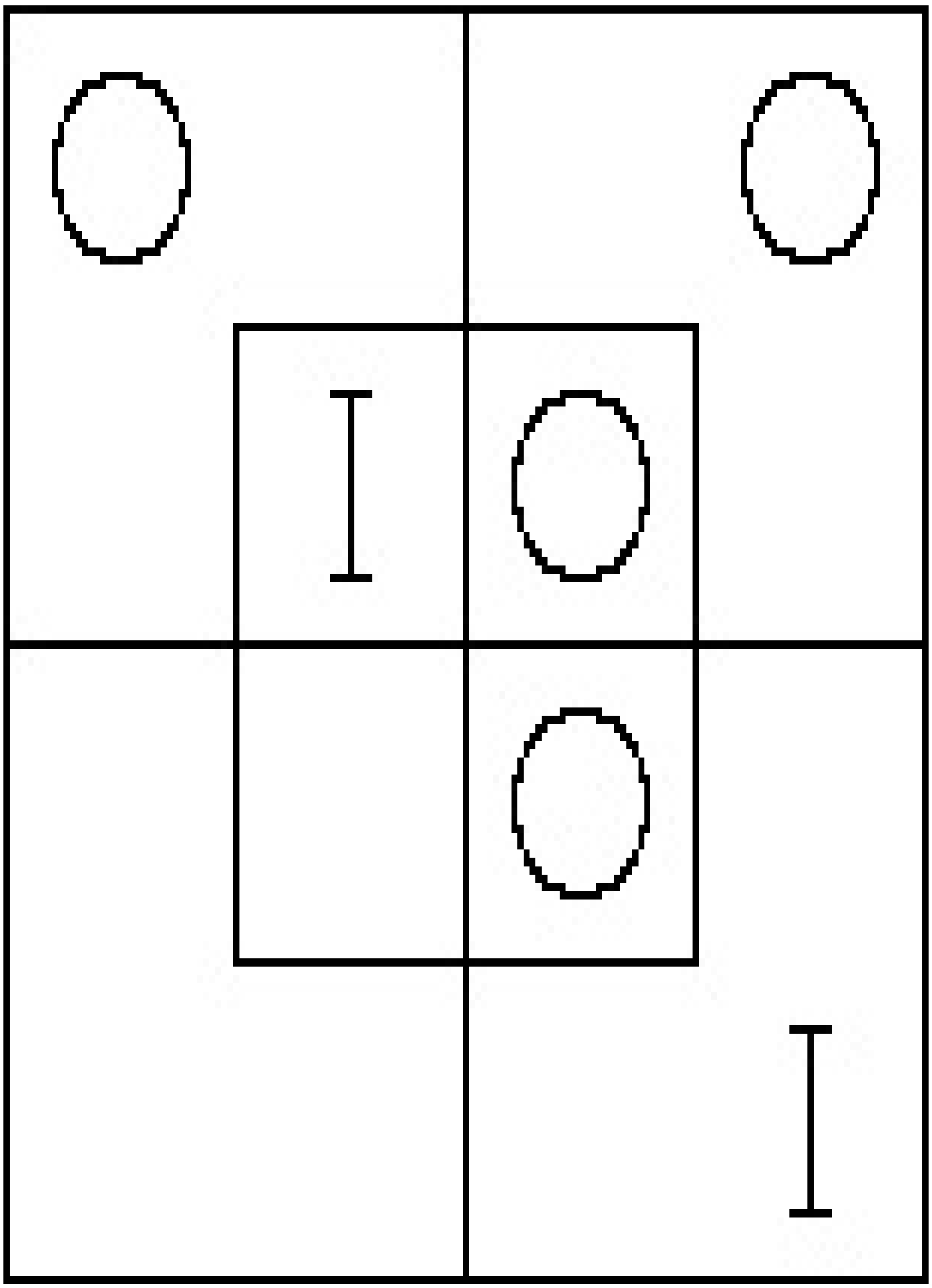


There is no Conclusion.

10.

All x are m;

All y′ are m′.



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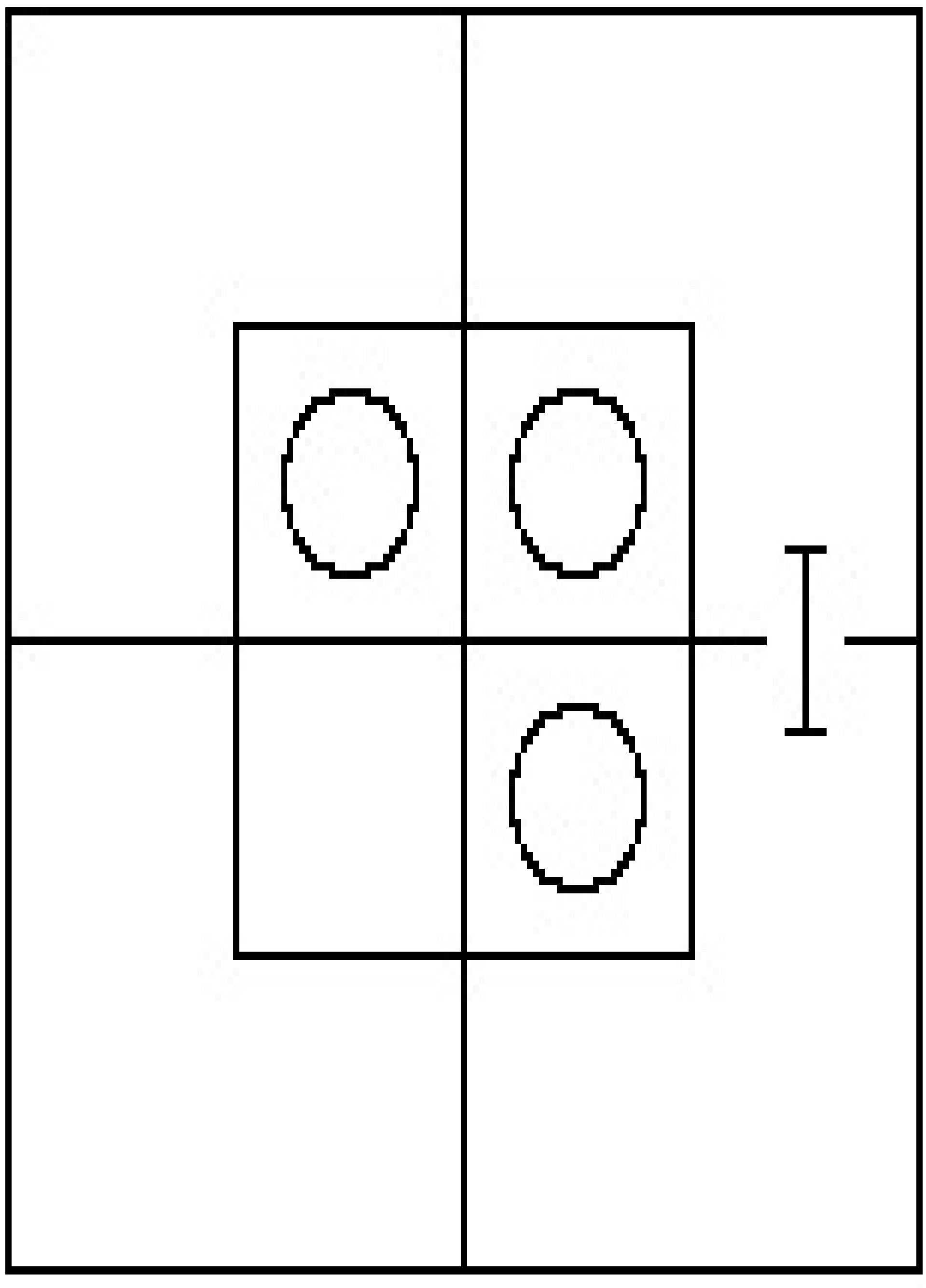
∴ All x are y;

All y′ are x′.

11.

No m are x;

All y′ are m′.

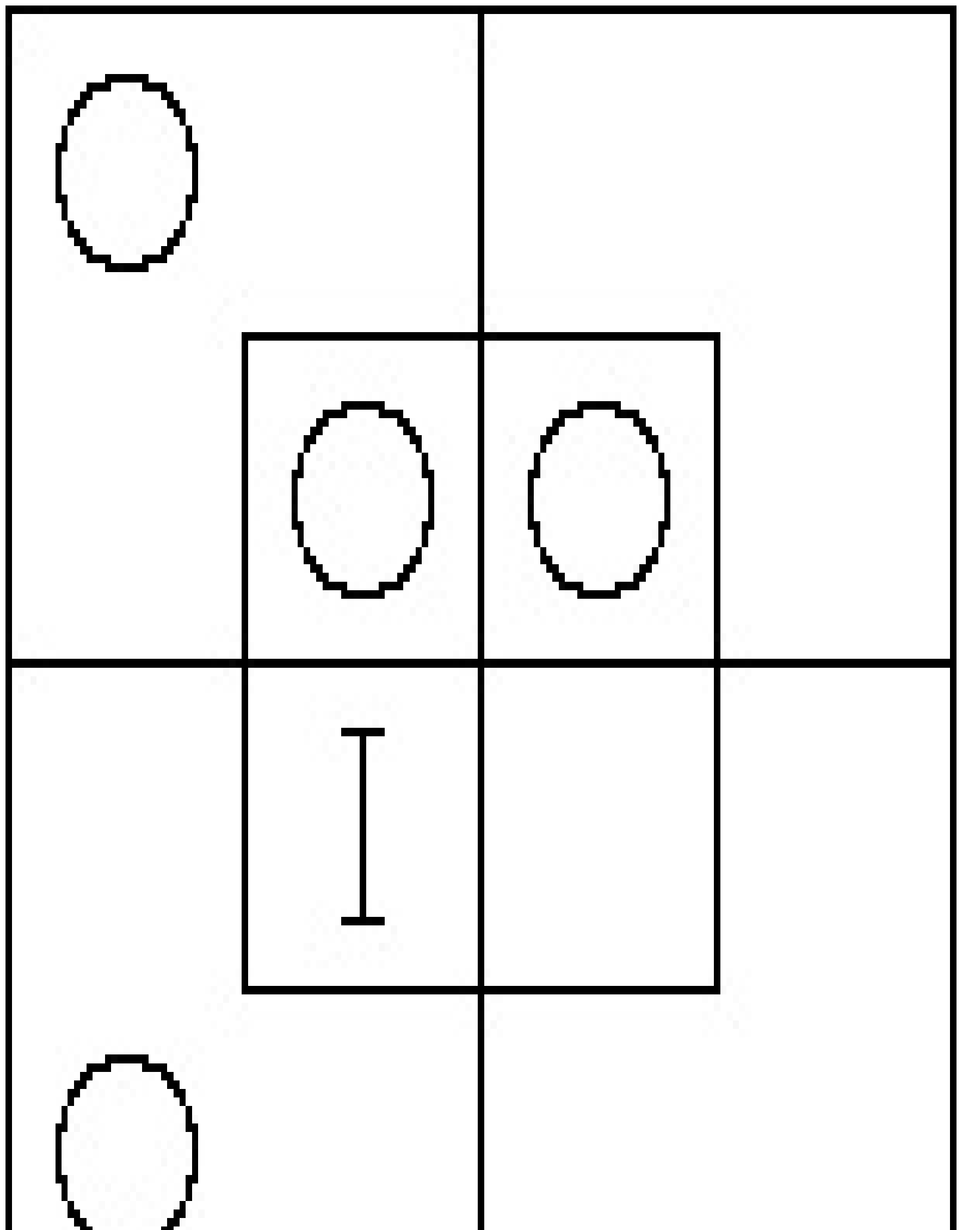


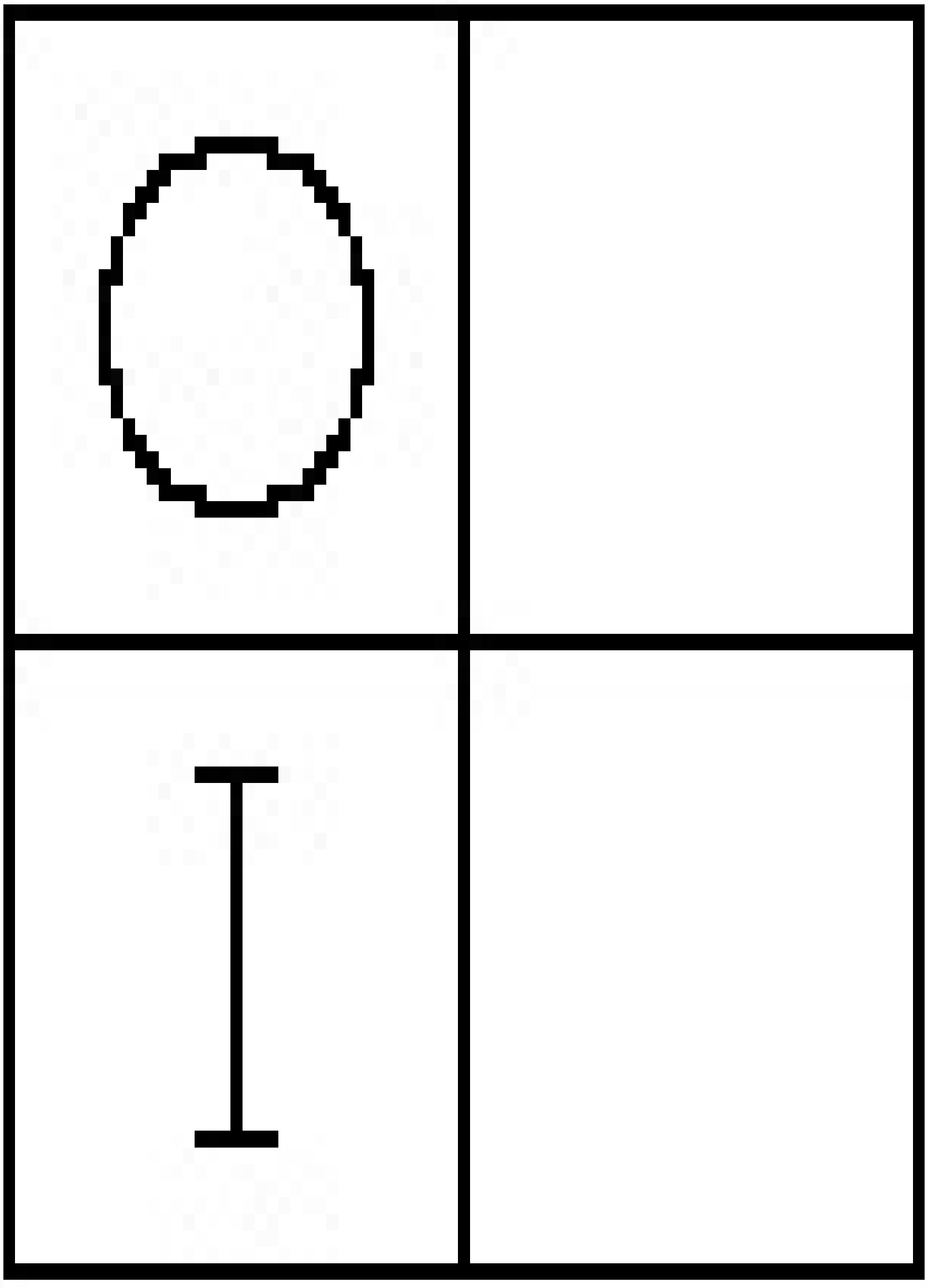
There is no Conclusion.

12.

No x are m;

All y are m.





∴ All y are x′.

SL5-A

Solutions for § 5, Nos. 1–12.

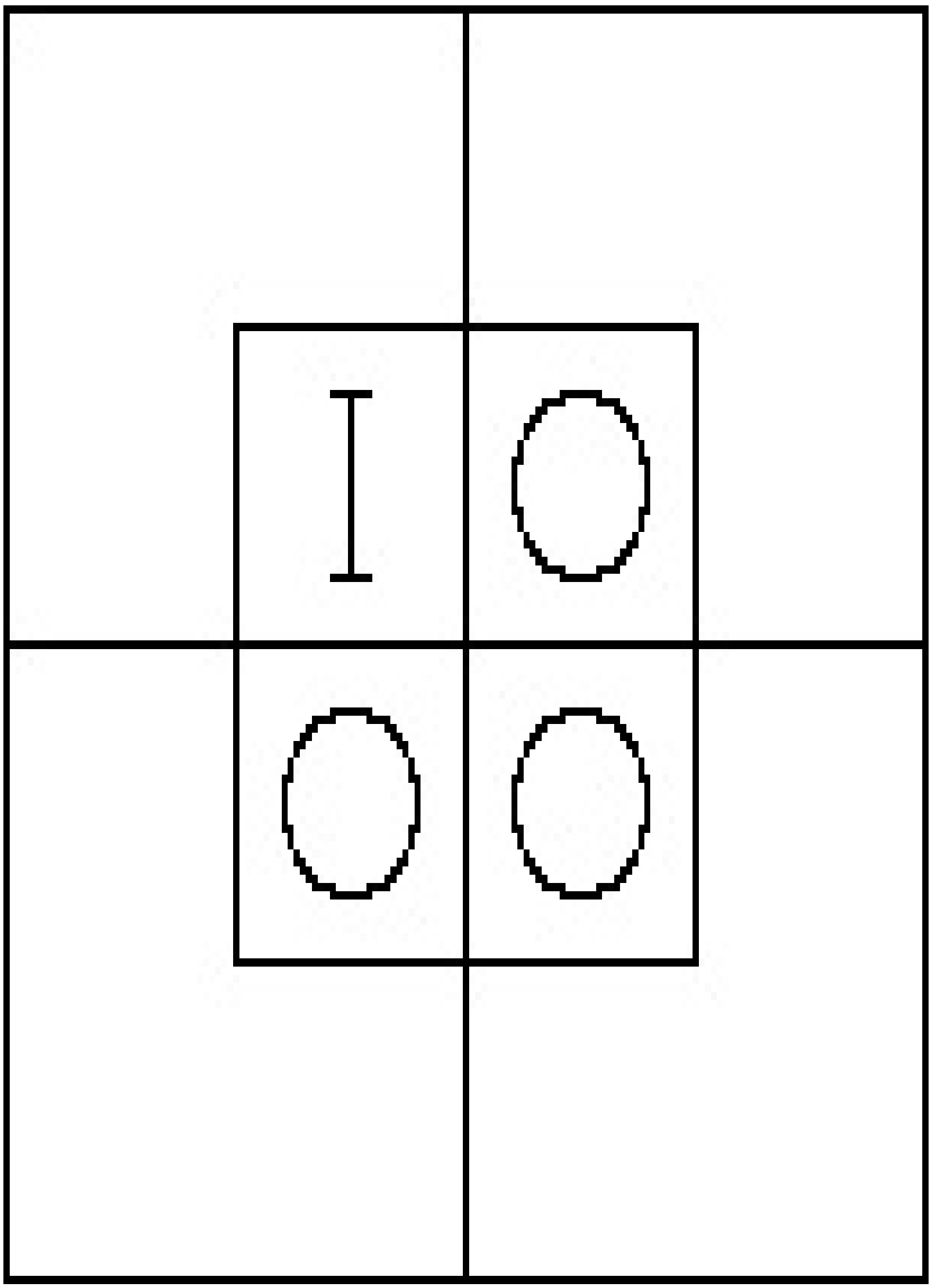
1. I have been out for a walk;

I am feeling better.

Univ. is “persons”; m = the Class of I’s; x = persons who have been out for a walk; y = persons who are feeling better.

All m are x;

All m are y.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$\therefore$ Some x are y.

i.e. Somebody, who has been out for a walk, is feeling better.

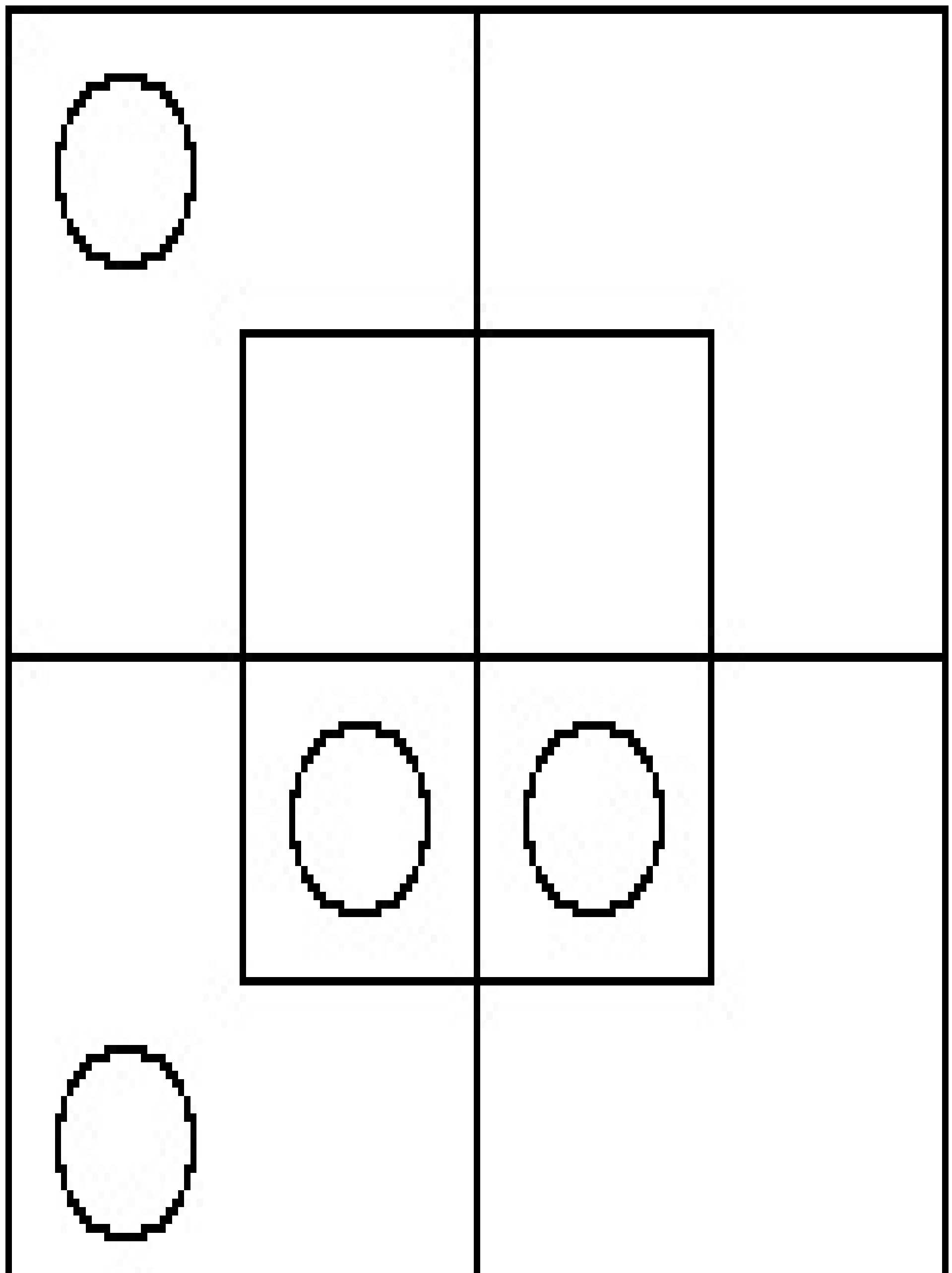
2. No one has read the letter but John;

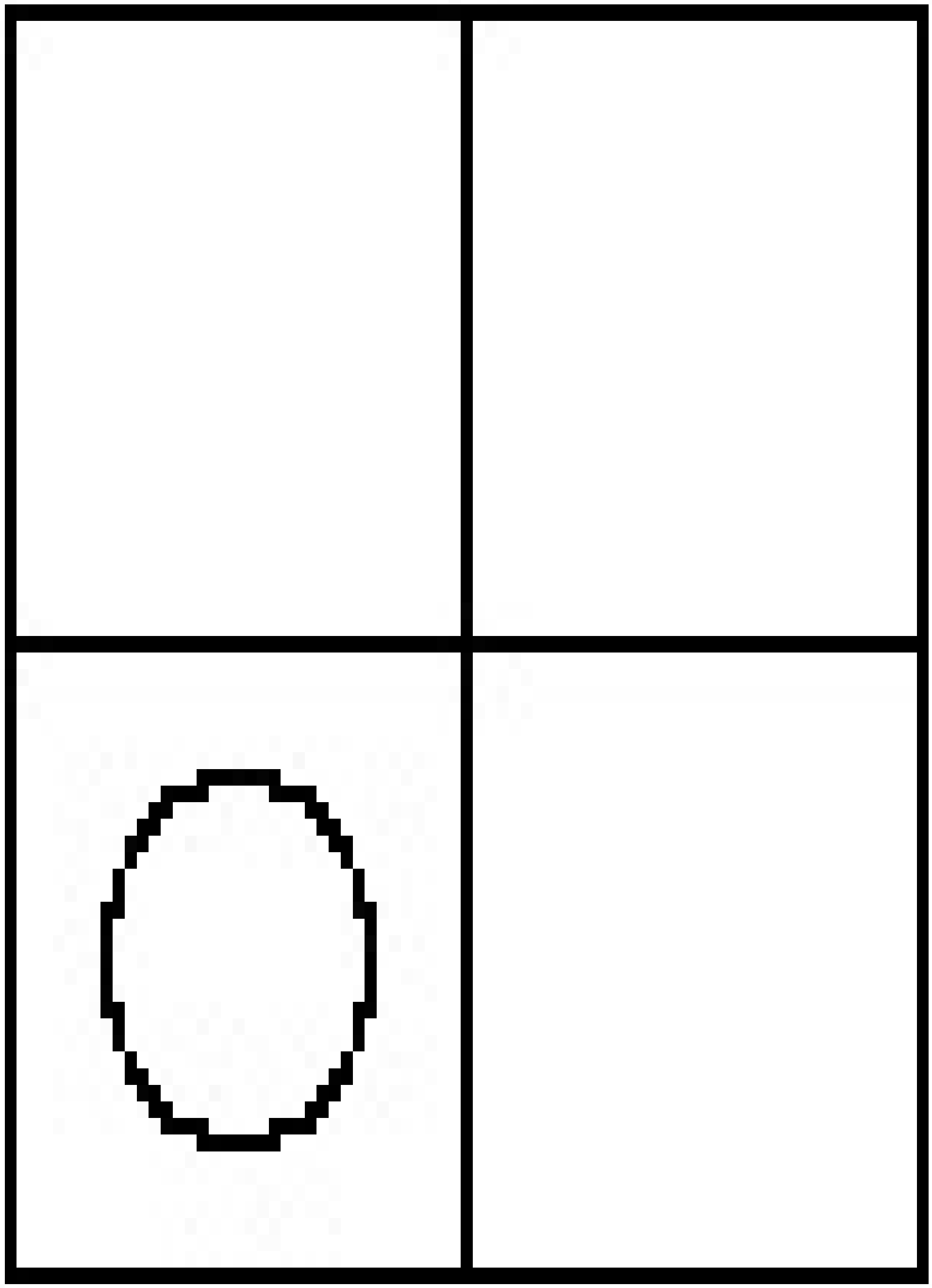
No one, who has not read it, knows what it is about.

Univ. is “persons”; m = persons who have read the letter; x = the Class of Johns; y = persons who know what the letter is about.

No x′ are m;

No m′ are y.





$\therefore$ No x′ are y.

i.e. No one, but John, knows what the letter is about.

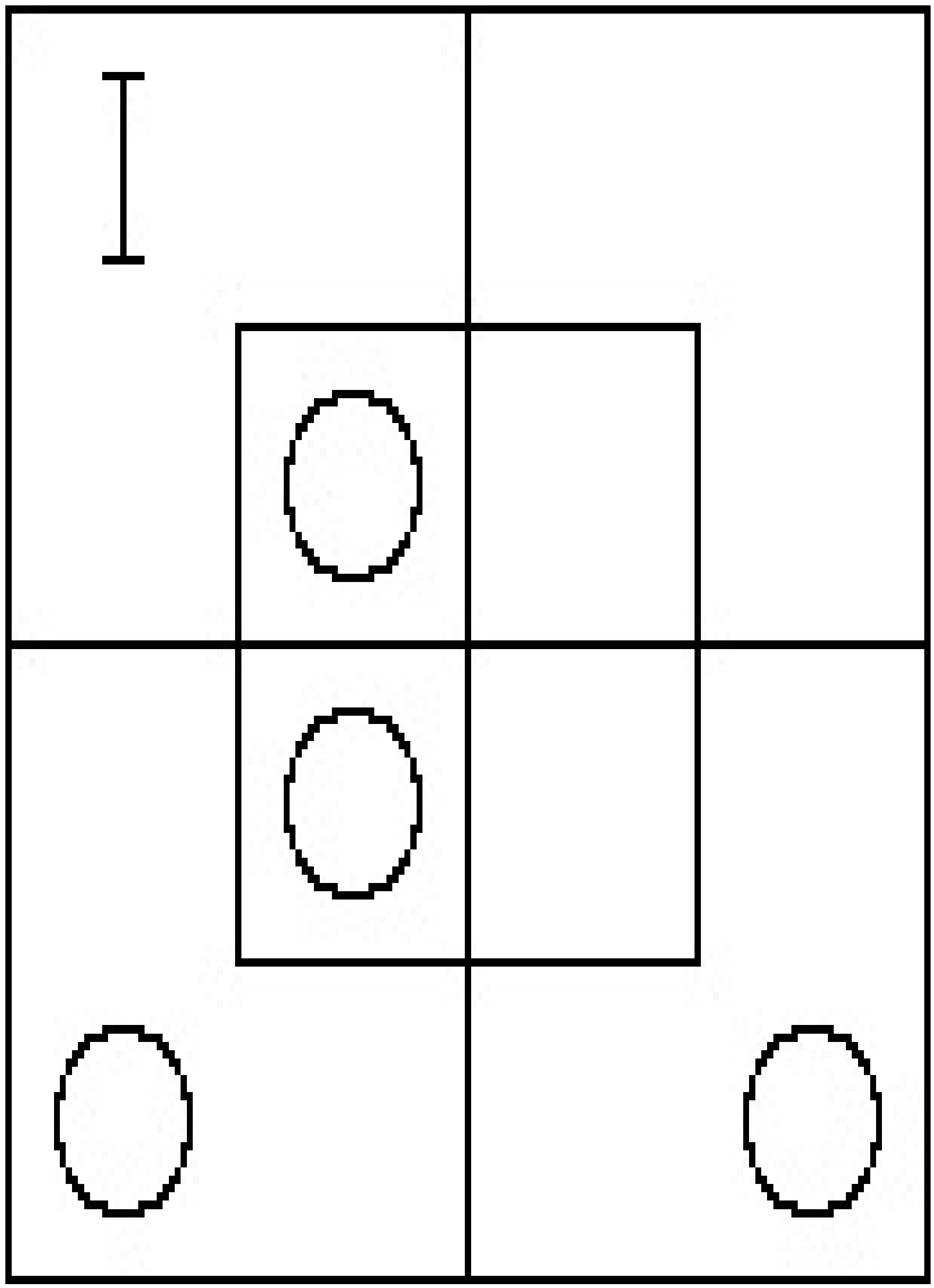
3. Those who are not old like walking;

You and I are young.

Univ. is “persons”; m = old; x = persons who like walking; y = you and I.

All m′ are x;

All y are m′.



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$\therefore$ All y are x.

i.e. You and I like walking.

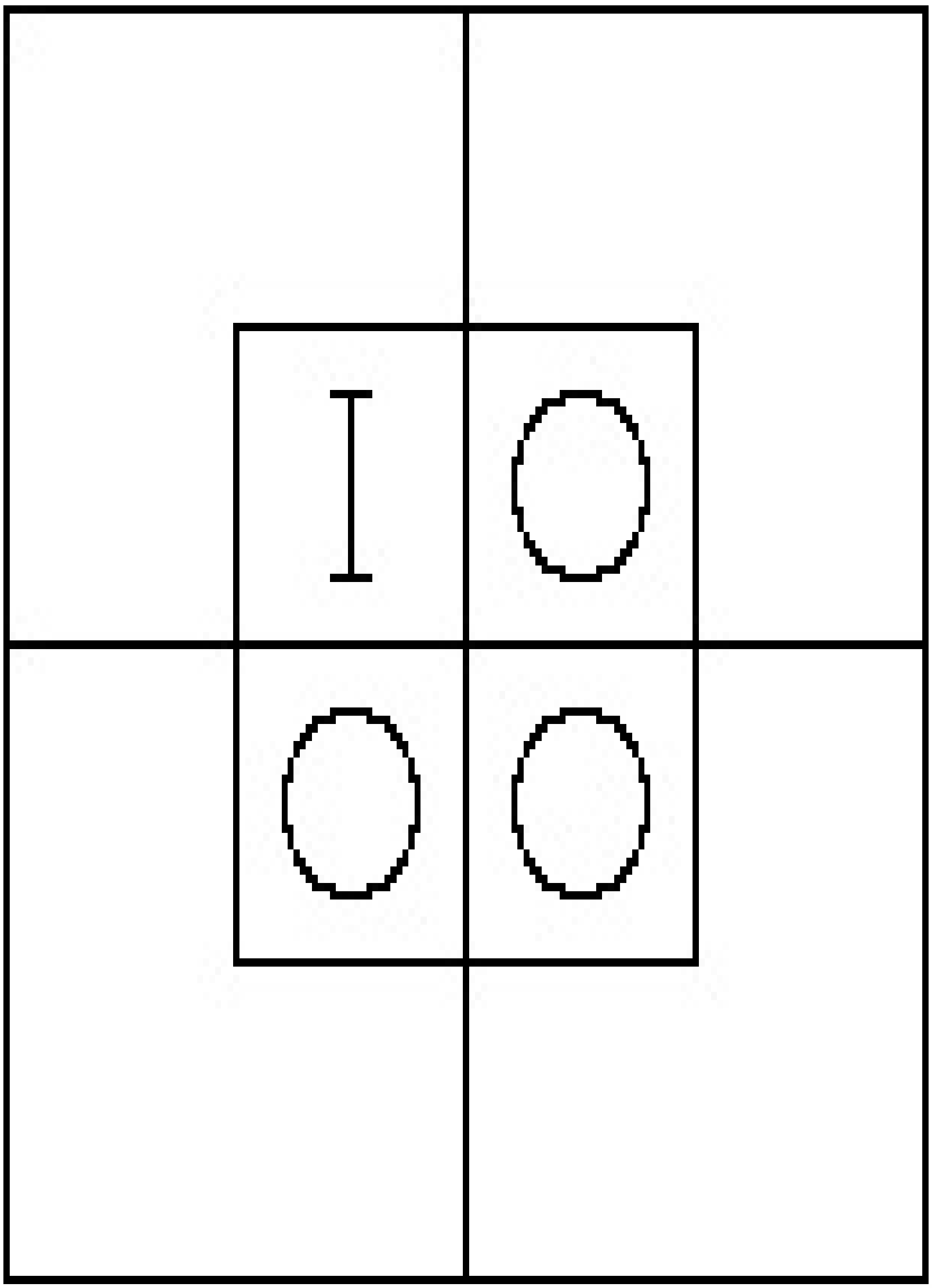
4. Your course is always honest;

Your course is always the best policy.

Univ. is “courses”; m = your; x = honest; y = courses which are the best policy.

All m are x;

All m are y.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∴ Some x are y.

i.e. Honesty is sometimes the best policy.

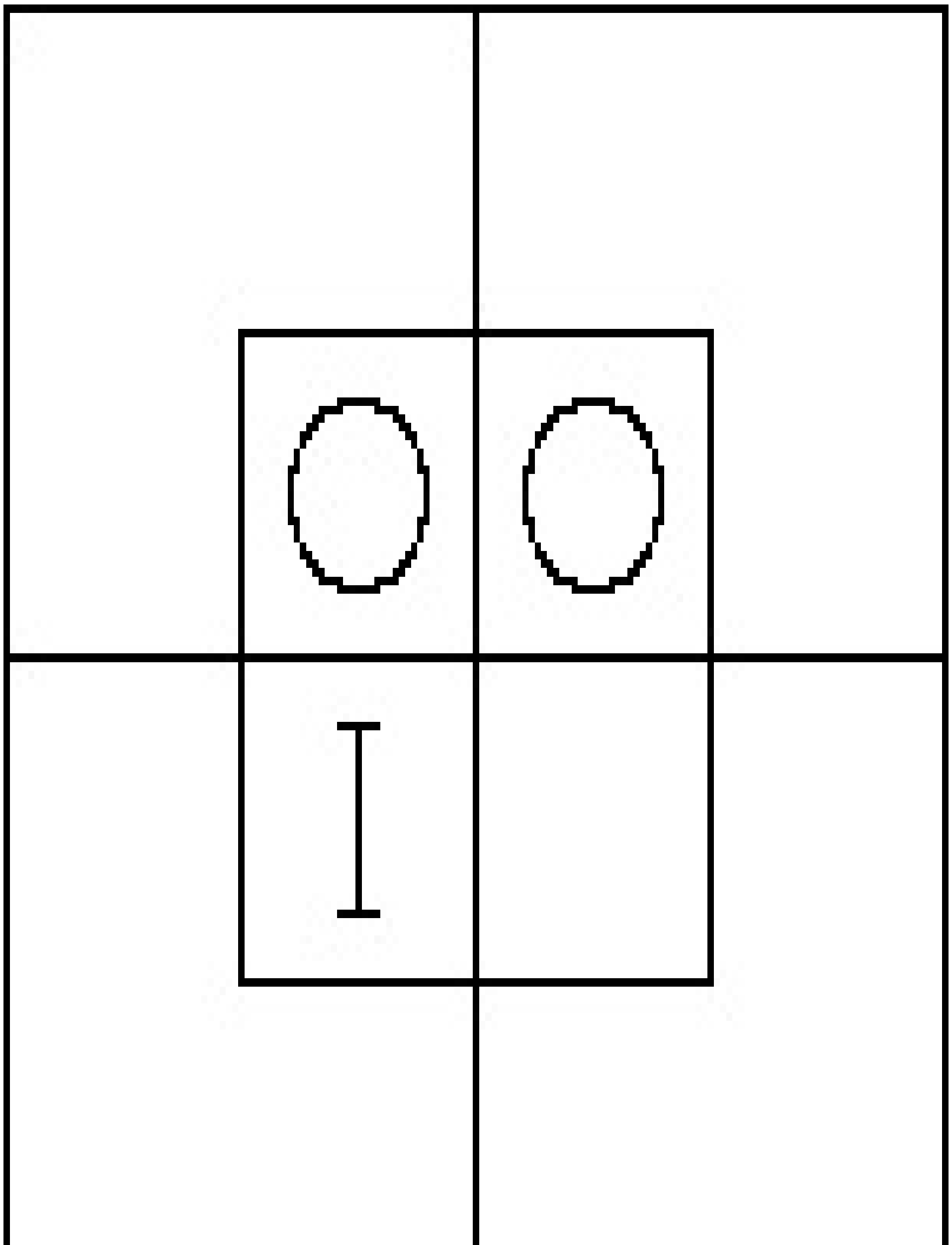
5. No fat creatures run well;

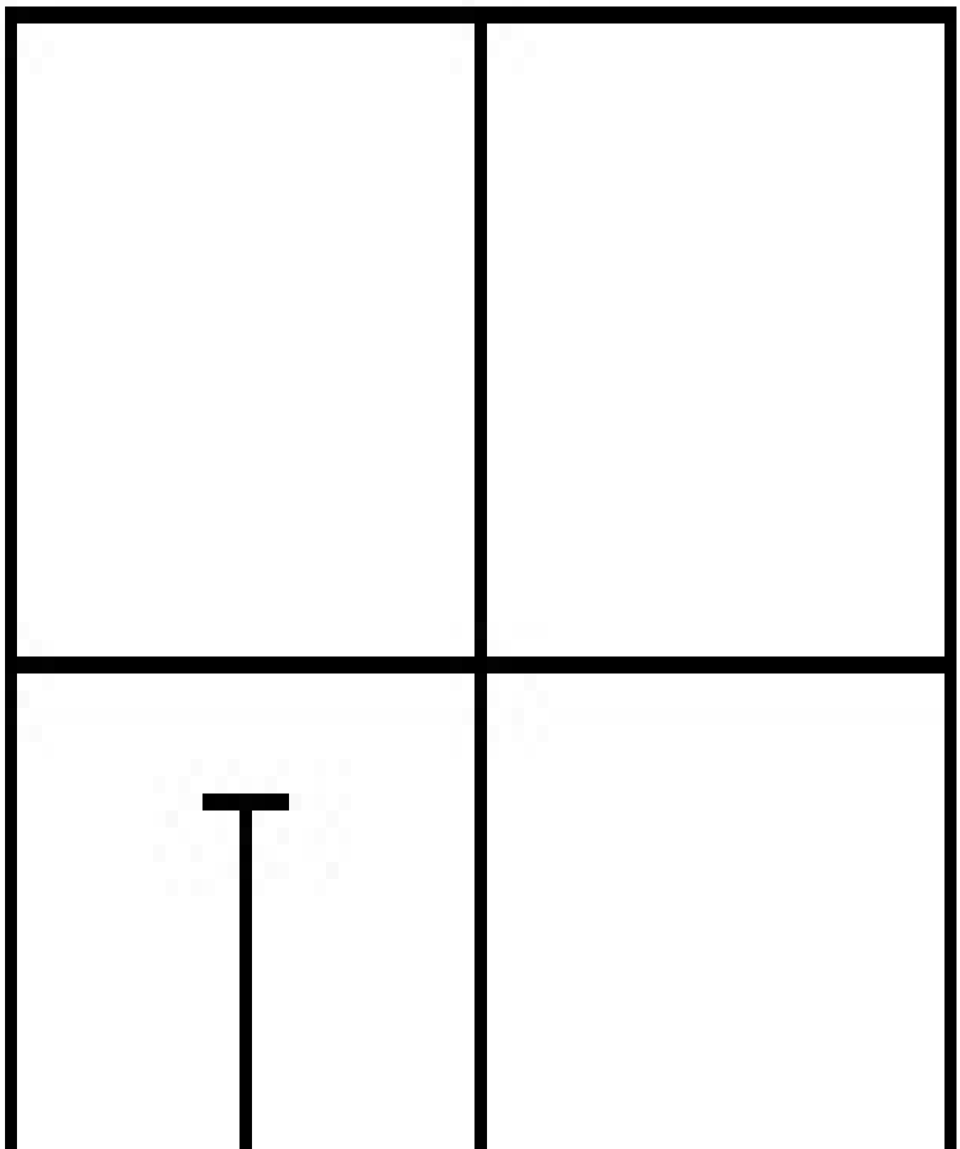
Some greyhounds run well.

Univ. is “creatures”; m = creatures that run well; x = fat; y = greyhounds.

No x are m;

Some y are m.





$\therefore$ Some y are x′.

i.e. Some greyhounds are not fat.

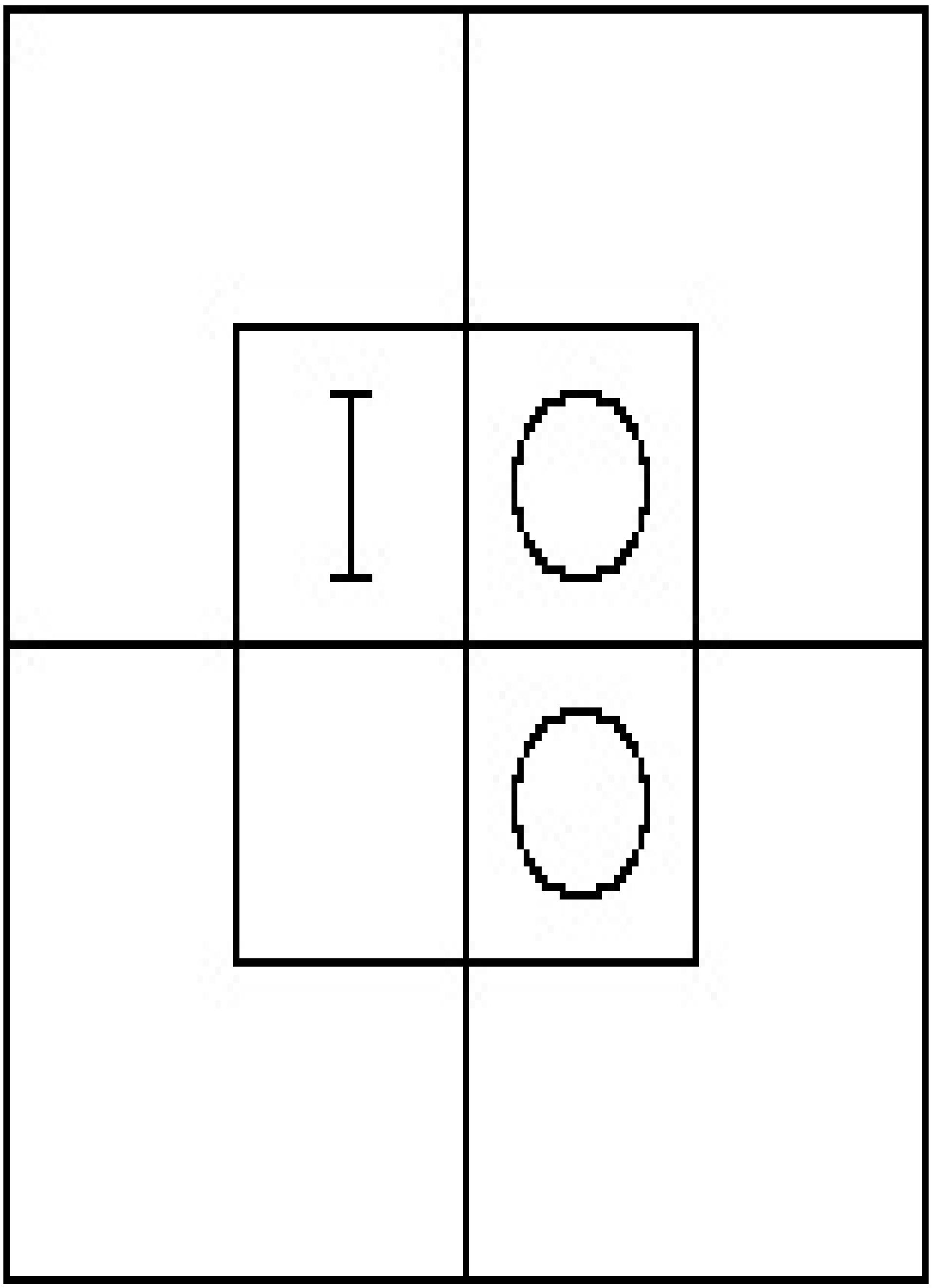
6. Some, who deserve the fair, get their deserts;

None but the brave deserve the fair.

Univ. is “persons”; m = persons who deserve the fair; x = persons who get their deserts; y = brave.

Some m are x;

No y′ are m.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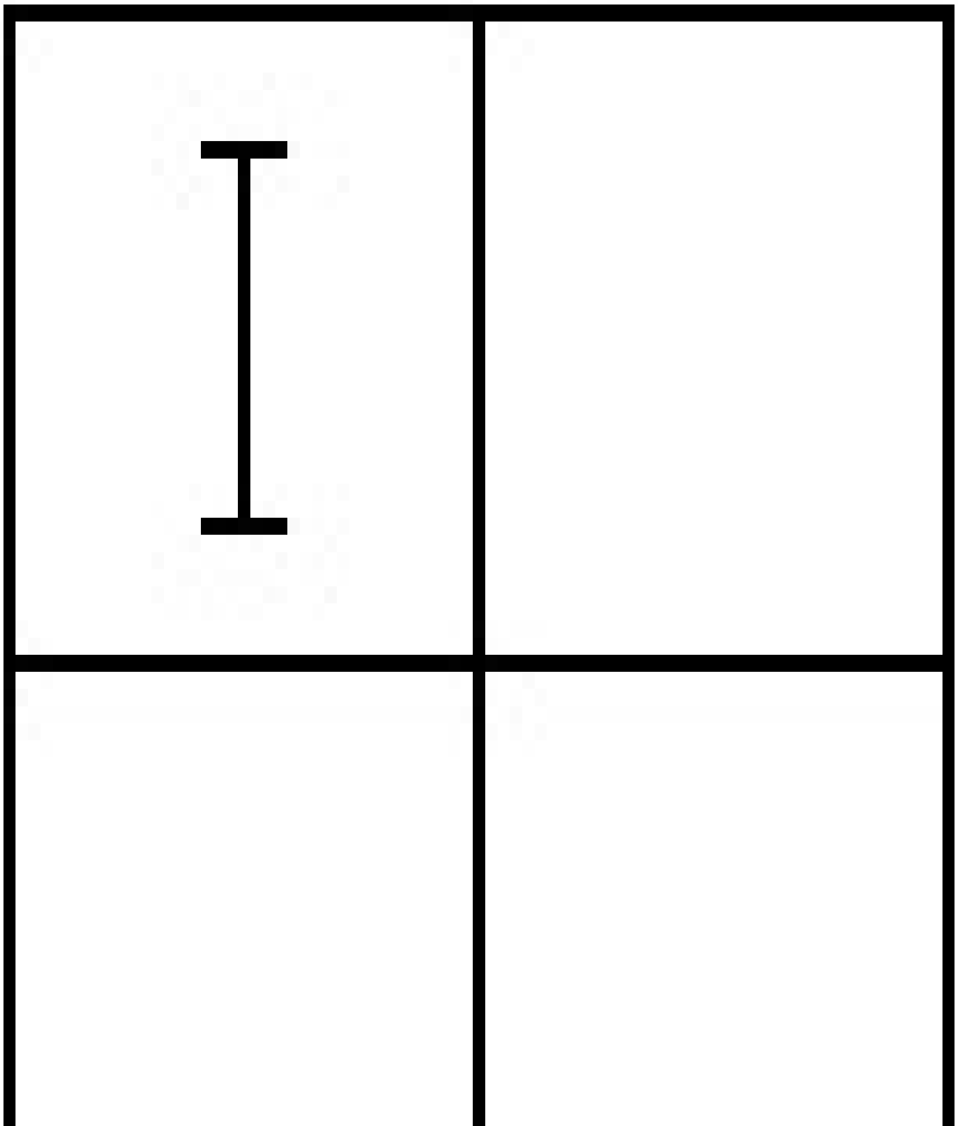
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$\therefore$ Some y are x.

i.e. Some brave persons get their deserts.

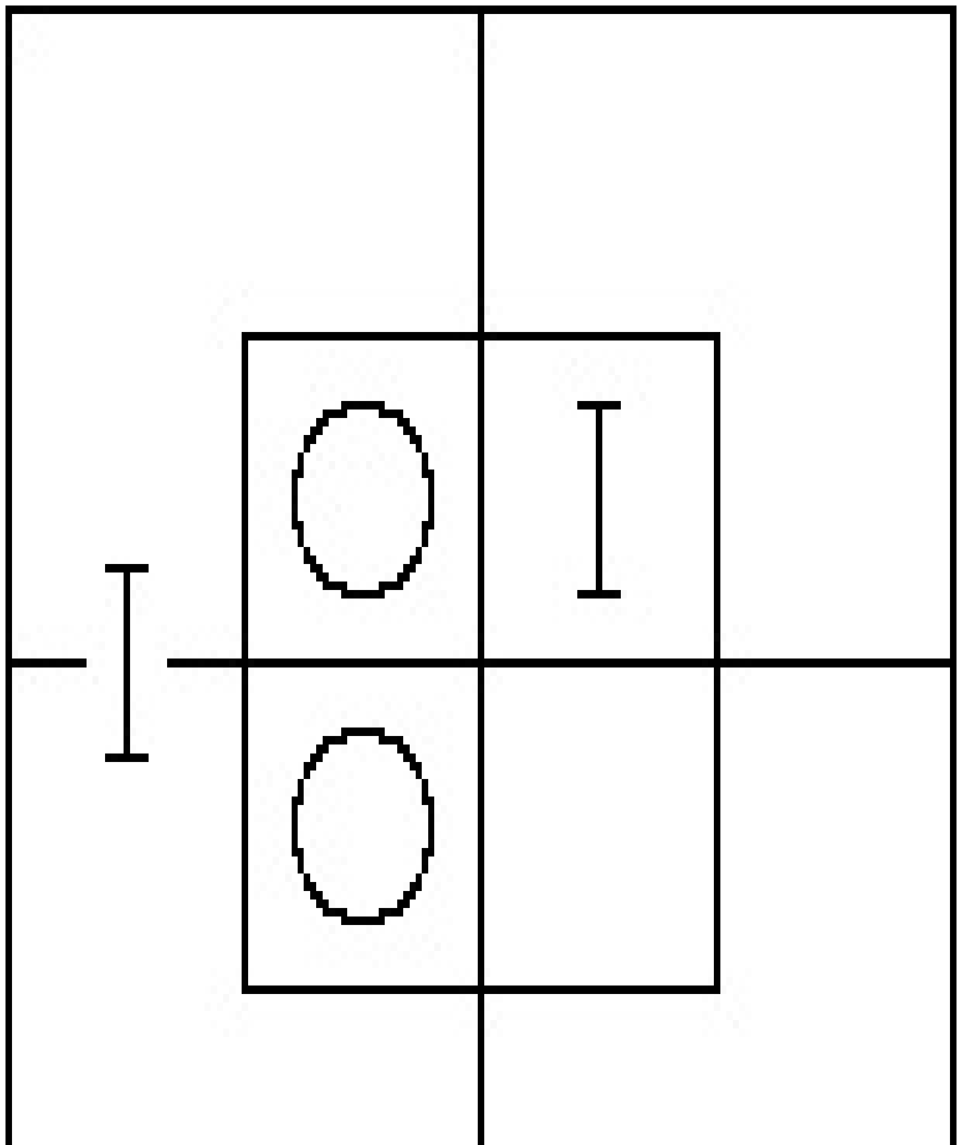
7. Some Jews are rich;

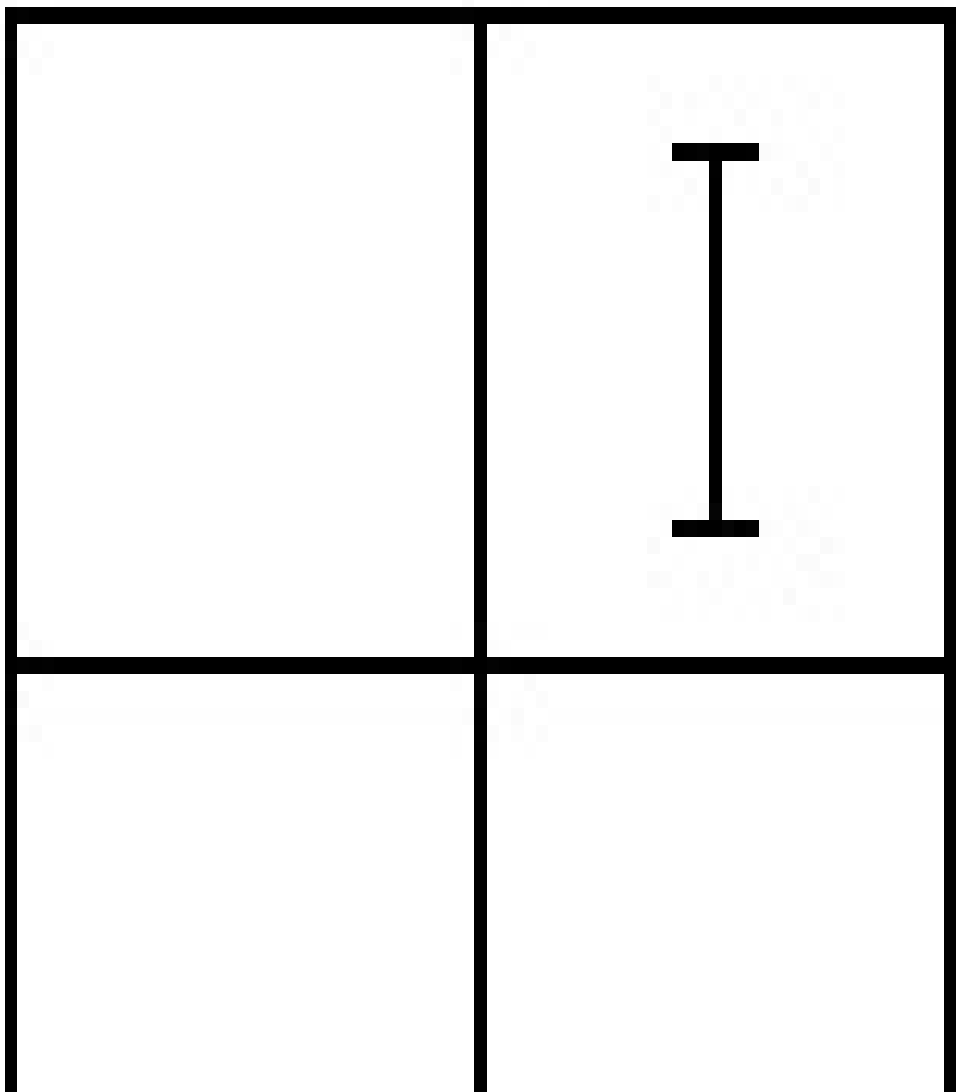
All Esquimaux are Gentiles.

Univ. is “persons”; m = Jews; x = rich; y = Esquimaux.

Some m are x;

All y are m′.





$\therefore$ Some x are y′.

i.e. Some rich persons are not Esquimaux.

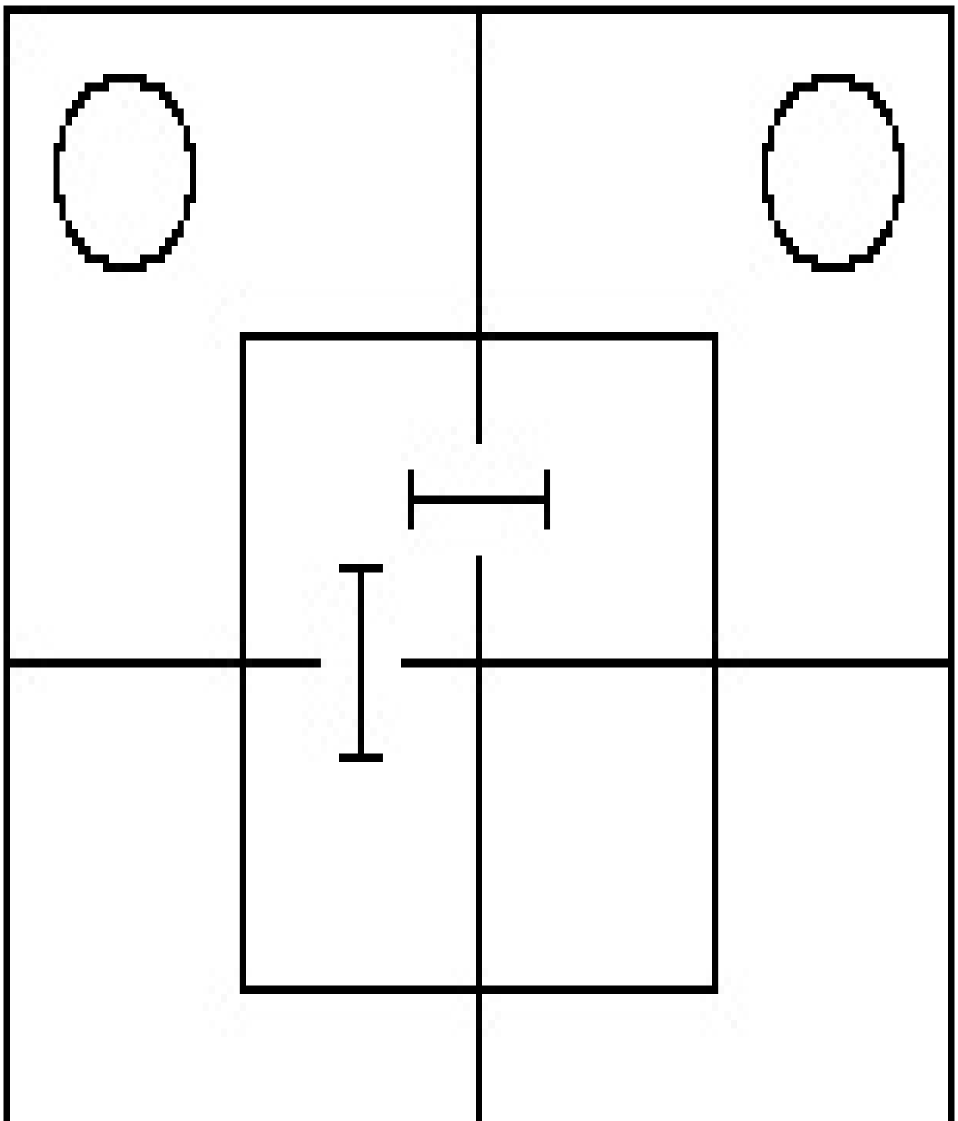
8. Sugar-plums are sweet;

Some sweet things are liked by children.

Univ. is “things”; m = sweet; x = sugar-plums; y = things that are liked by children.

All x are m;

Some m are y.



There is no Conclusion.

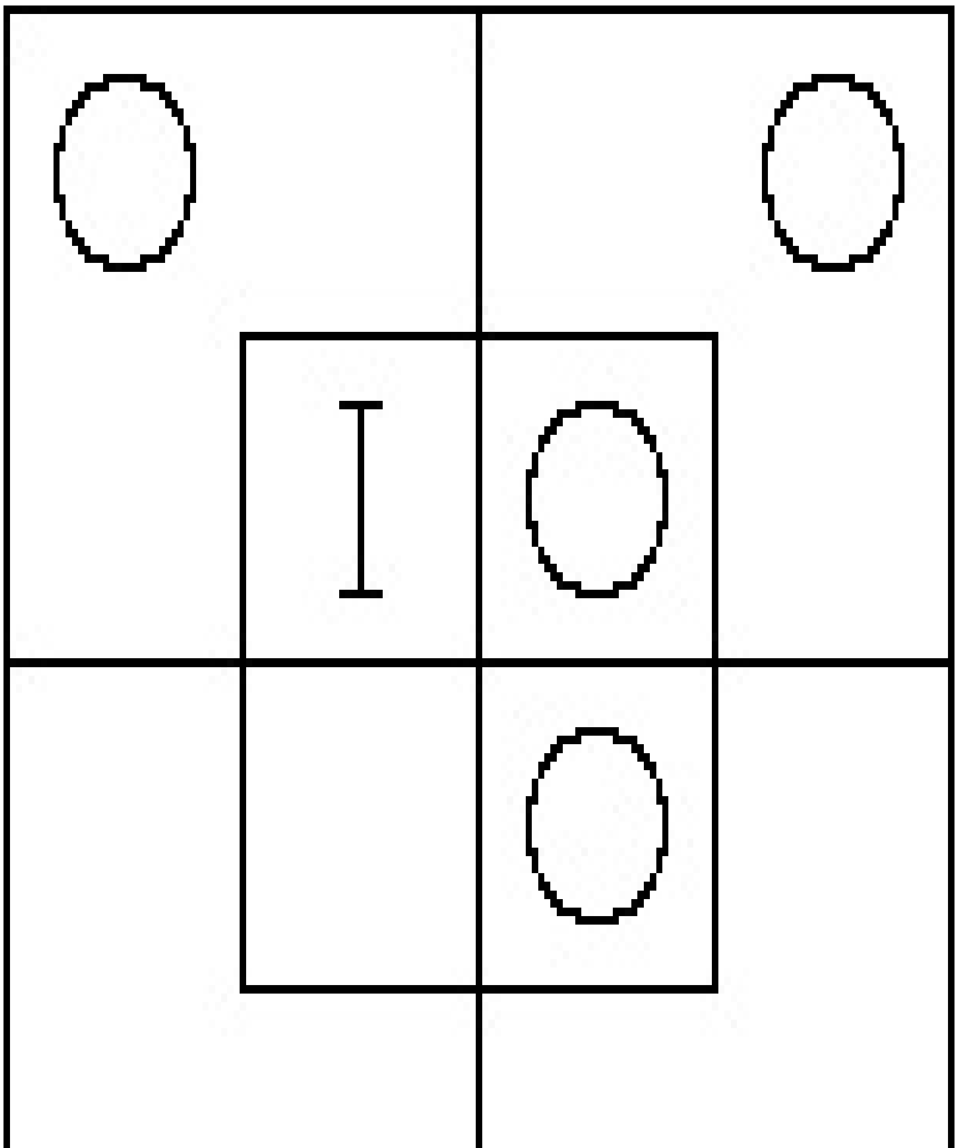
9. John is in the house;

Everybody in the house is ill.

Univ. is “persons”; m = persons in the house; x = the Class of Johns; y = ill.

All x are m;

All m are y.



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∴ All x are y.

i.e. John is ill.

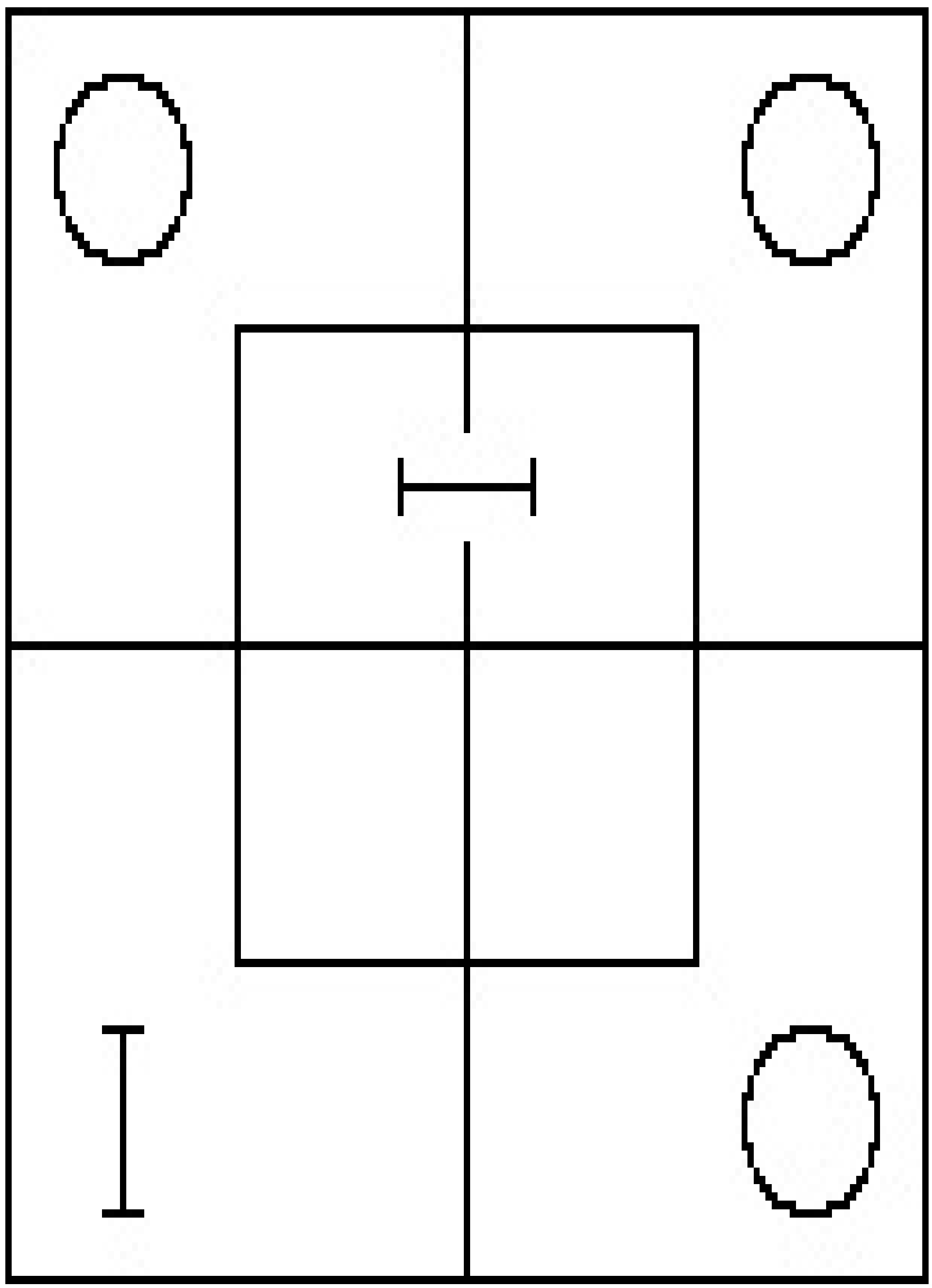
10. Umbrellas are useful on a journey;

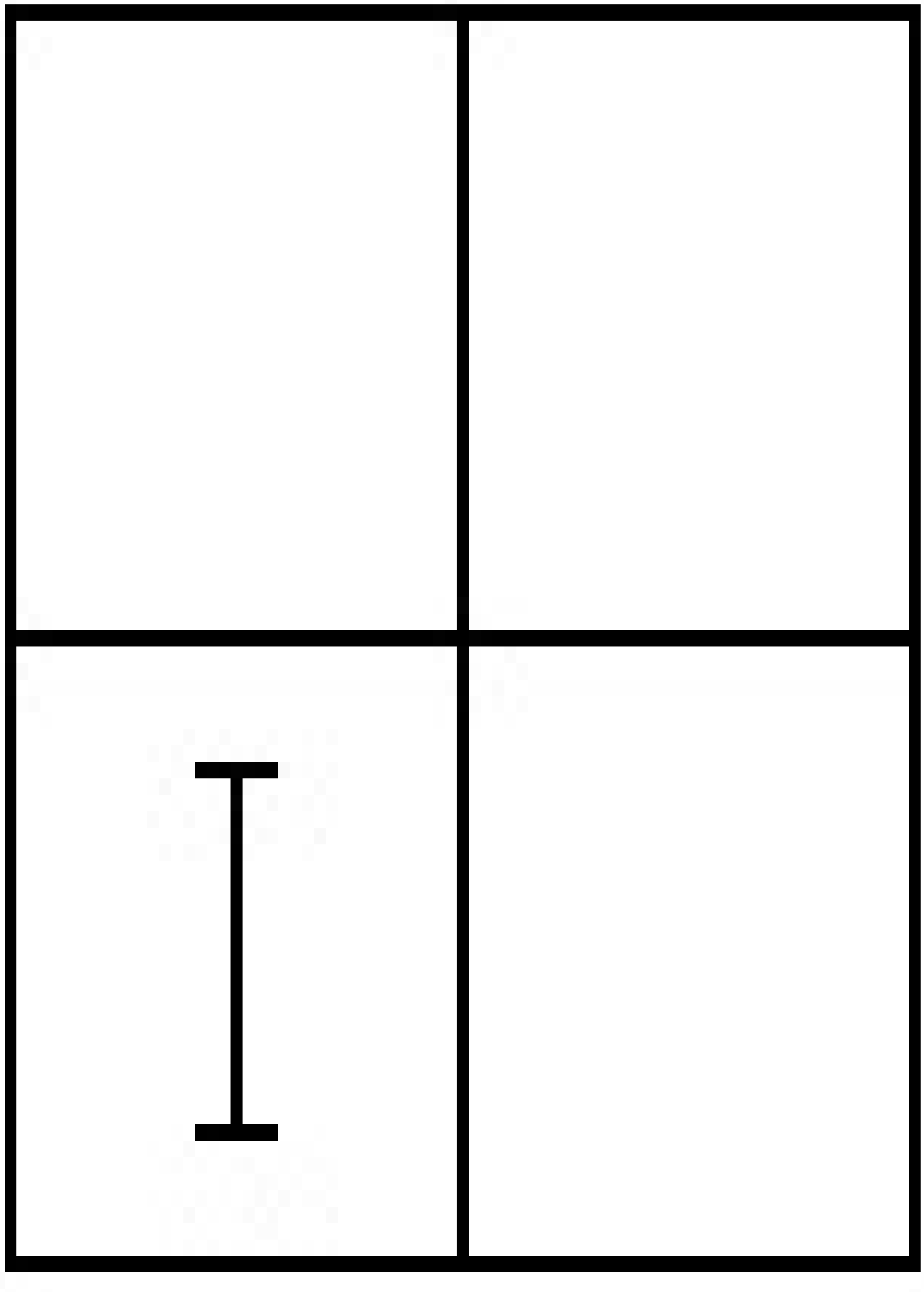
What is useless on a journey should be left behind.

Univ. is “things”; m = useful on a journey; x = umbrellas; y = things that should be left behind.

All x are m;

All m′ are y.





$\therefore$ Some x′ are y.

i.e. Some things, that are not umbrellas, should be left behind on a journey.

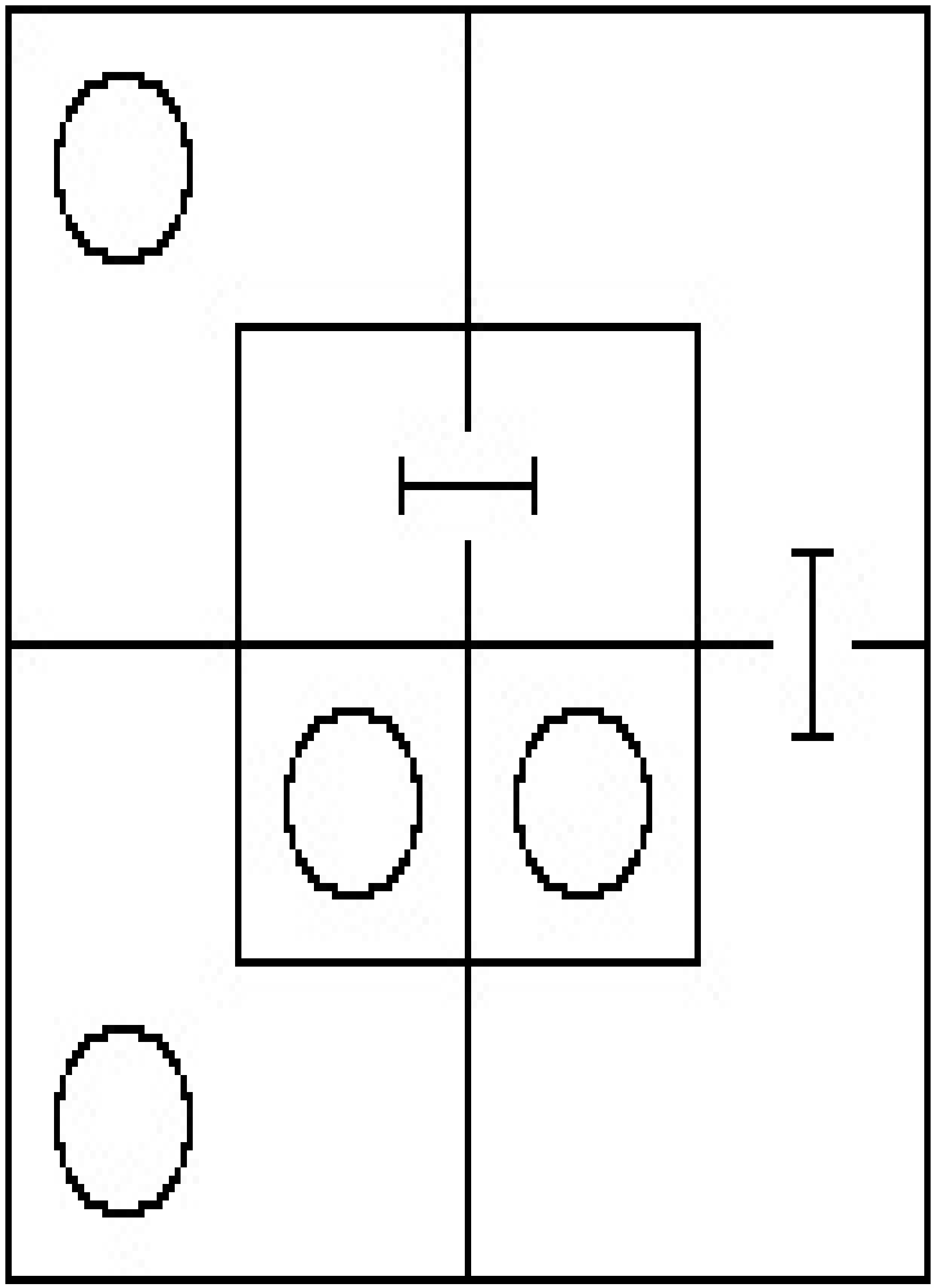
11. Audible music causes vibration in the air;

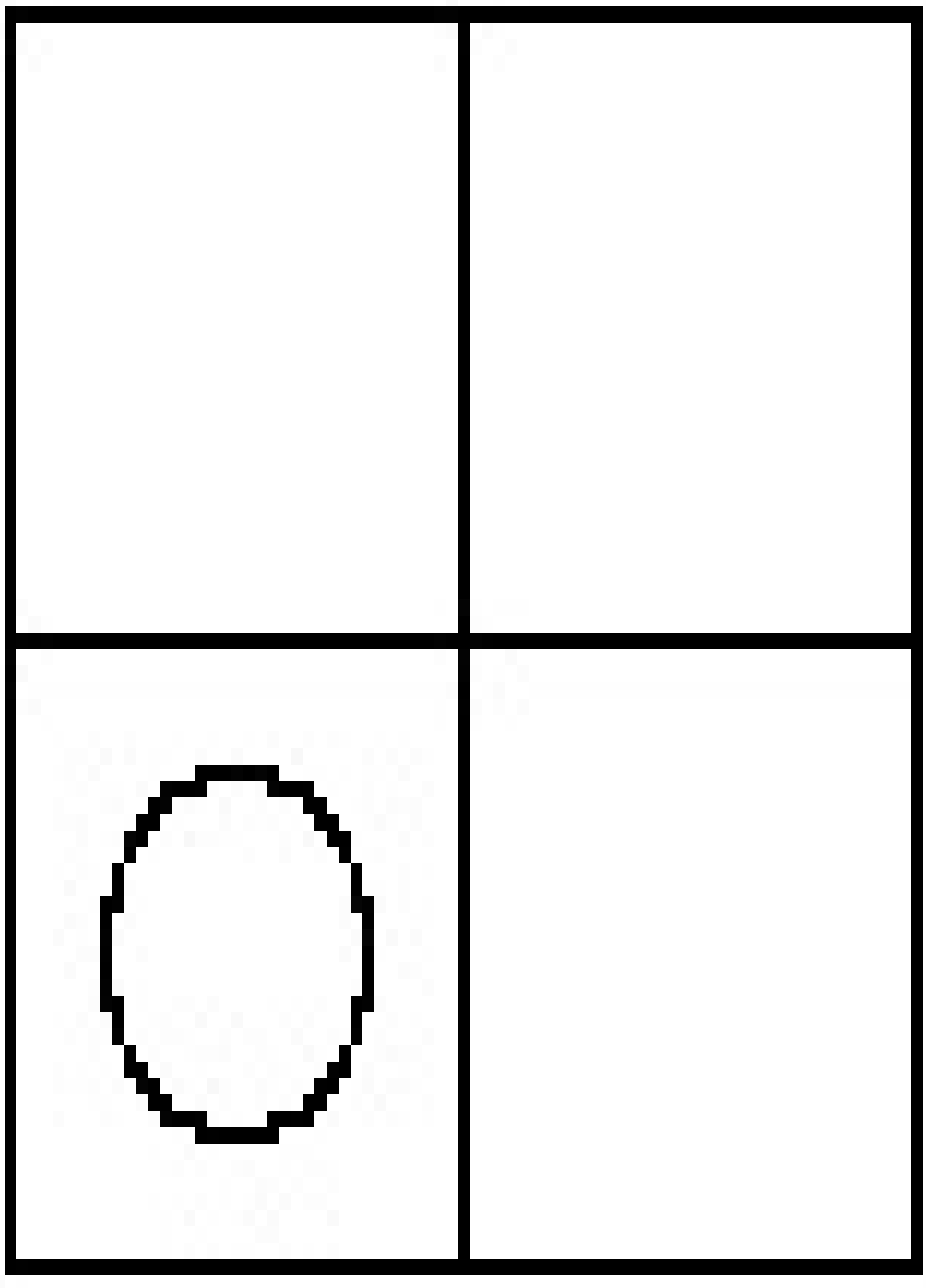
Inaudible music is not worth paying for.

Univ. is “music”; m = audible; x = music that causes vibration in the air; y = worth paying for.

All m are x;

All m′ are y′.





$\therefore$ No x′ are y.

i.e. No music is worth paying for, unless it causes vibration in the air.

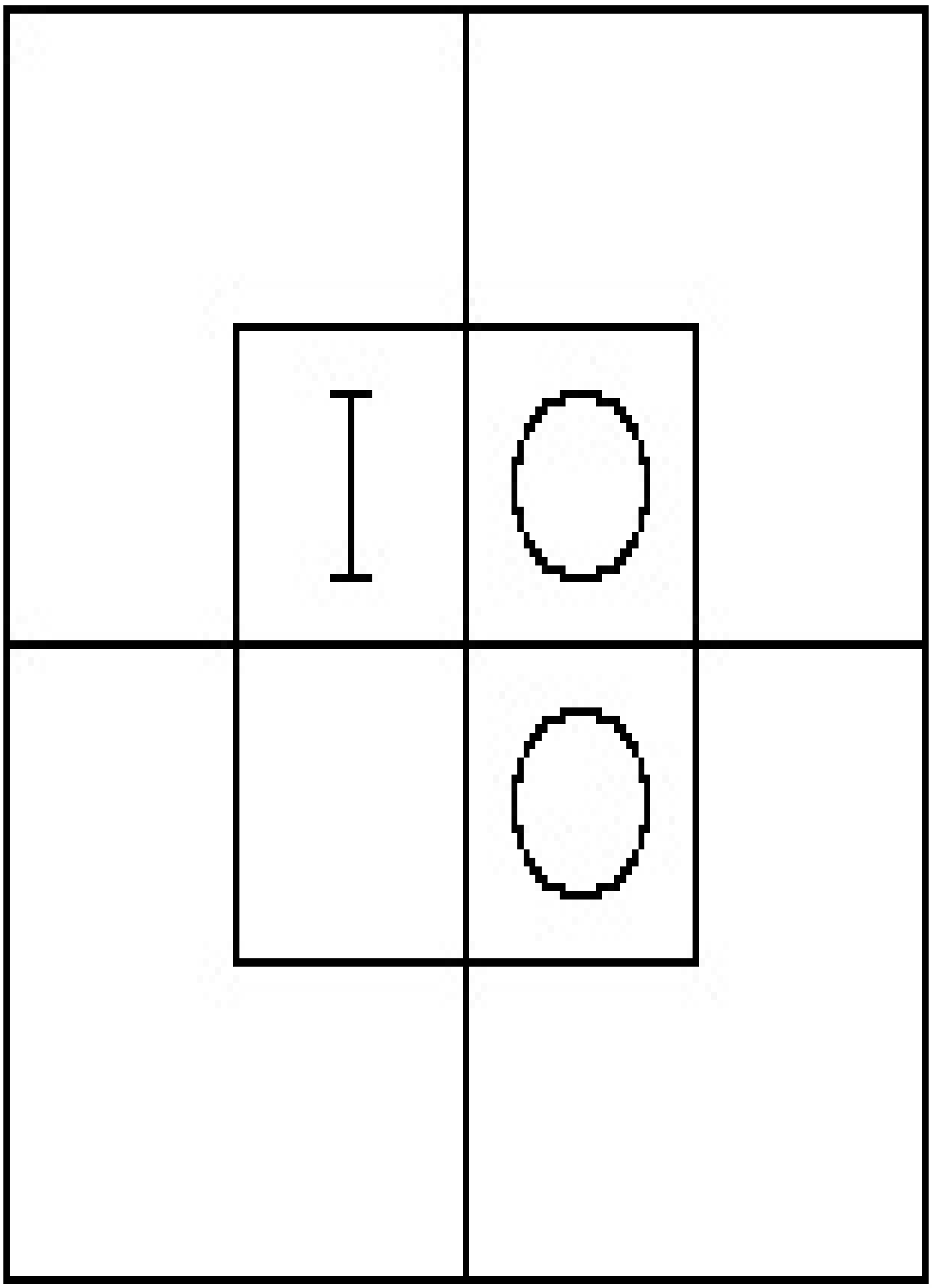
12. Some holidays are rainy;

Rainy days are tiresome.

Univ. is “days”; m = rainy; x = holidays; y = tiresome.

Some x are m;

All m are y.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∴ Some x are y.

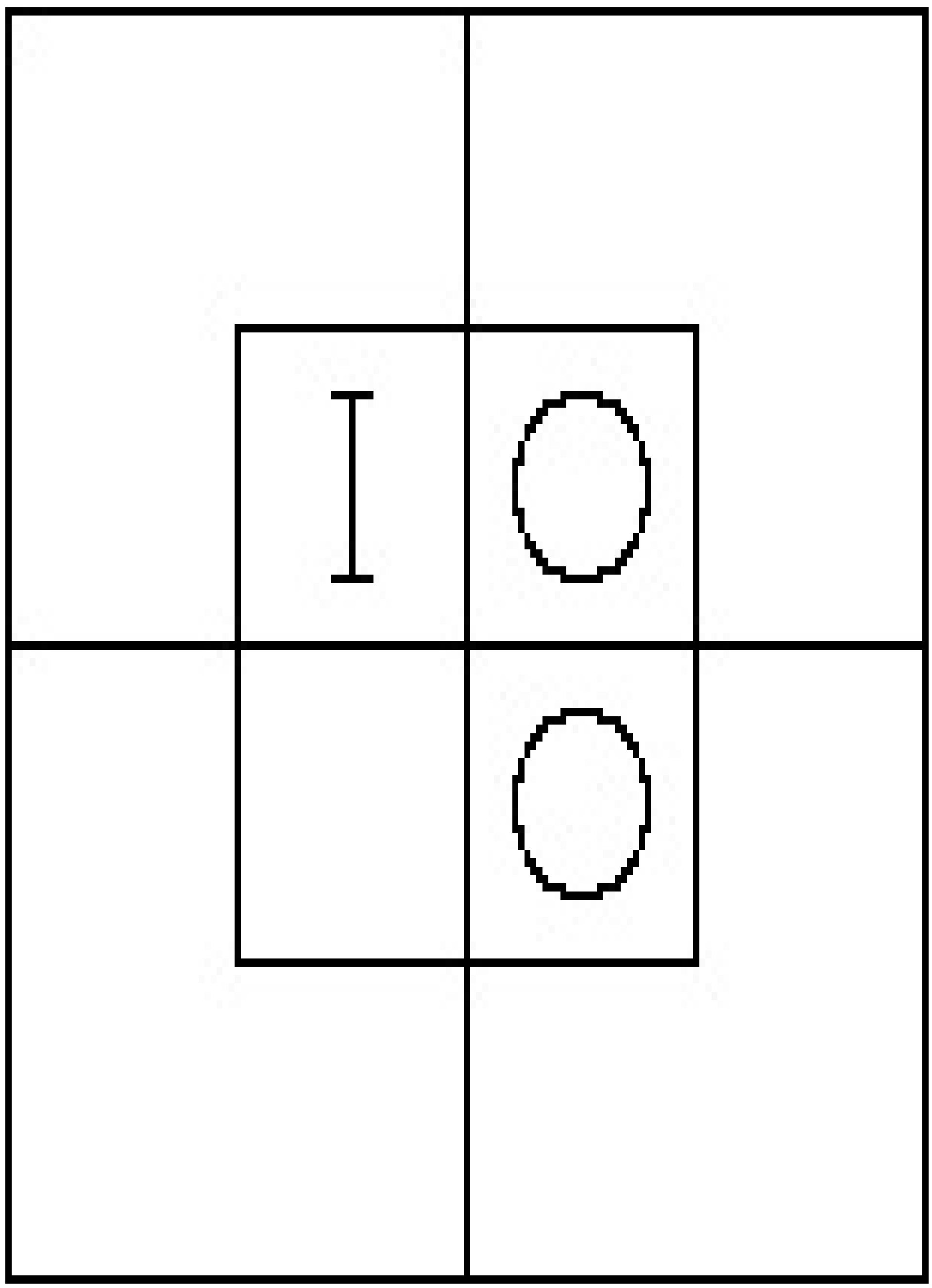
i.e. Some holidays are tiresome.

SL6-A

Solutions for § 6, Nos. 1–10.

1.

Some x are m; No m are y′. Some x are y.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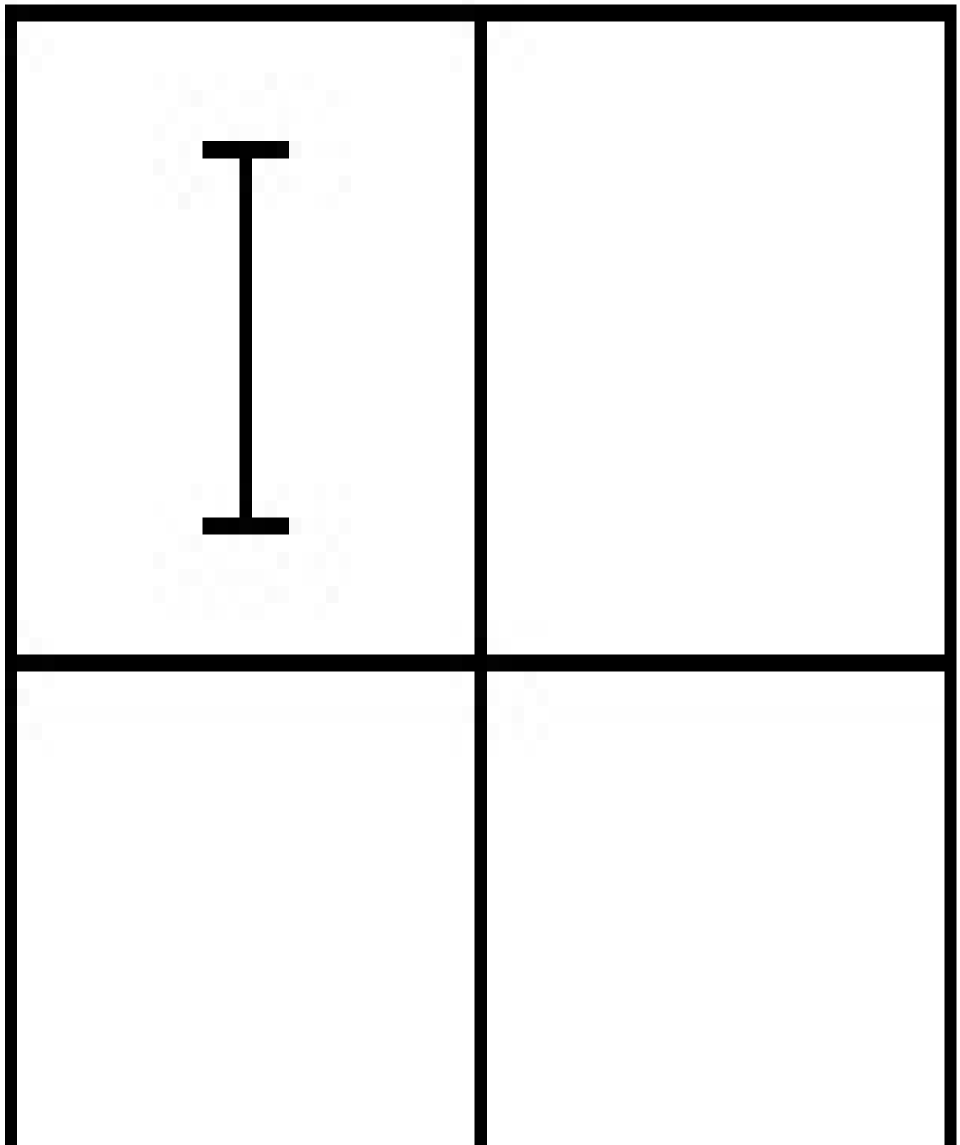
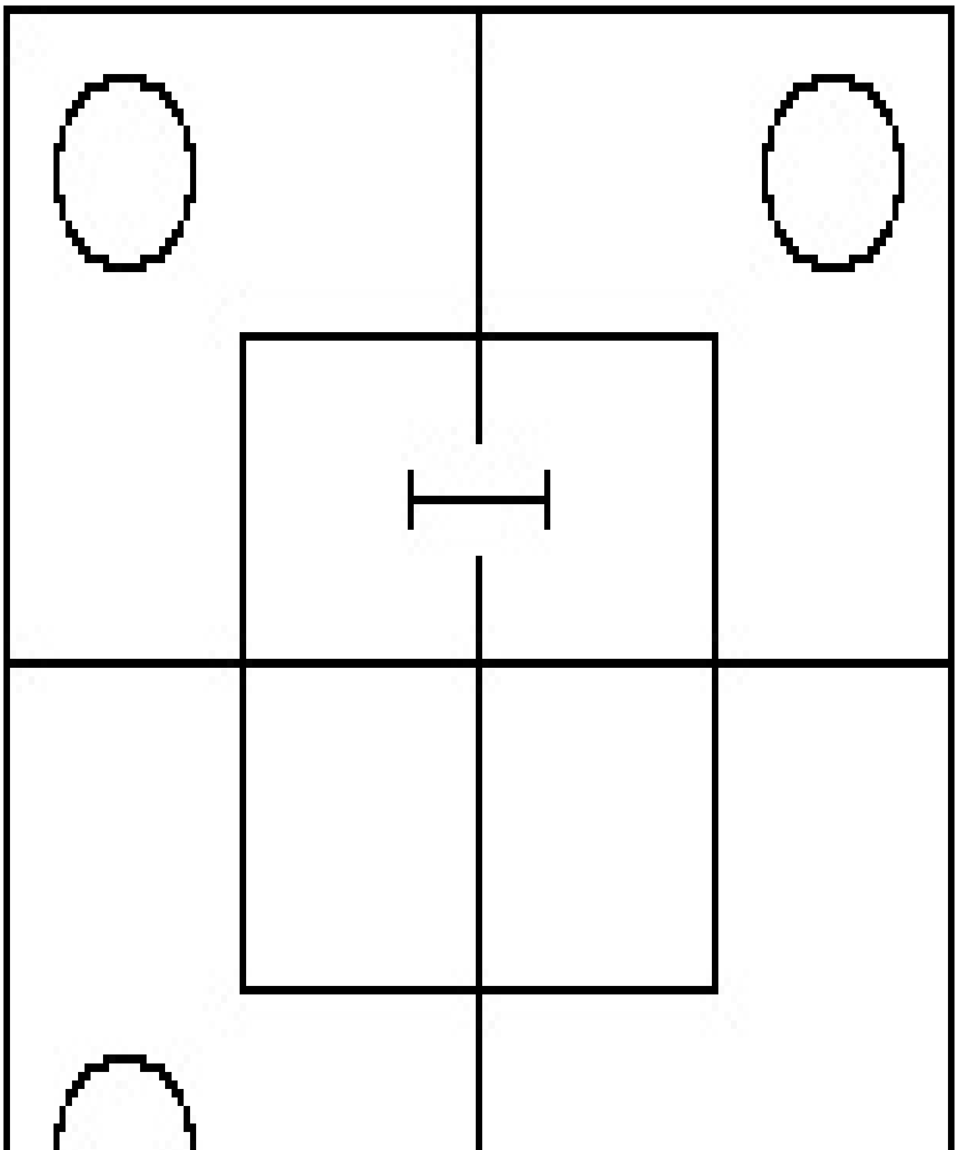


Hence proposed Conclusion is right.

2.

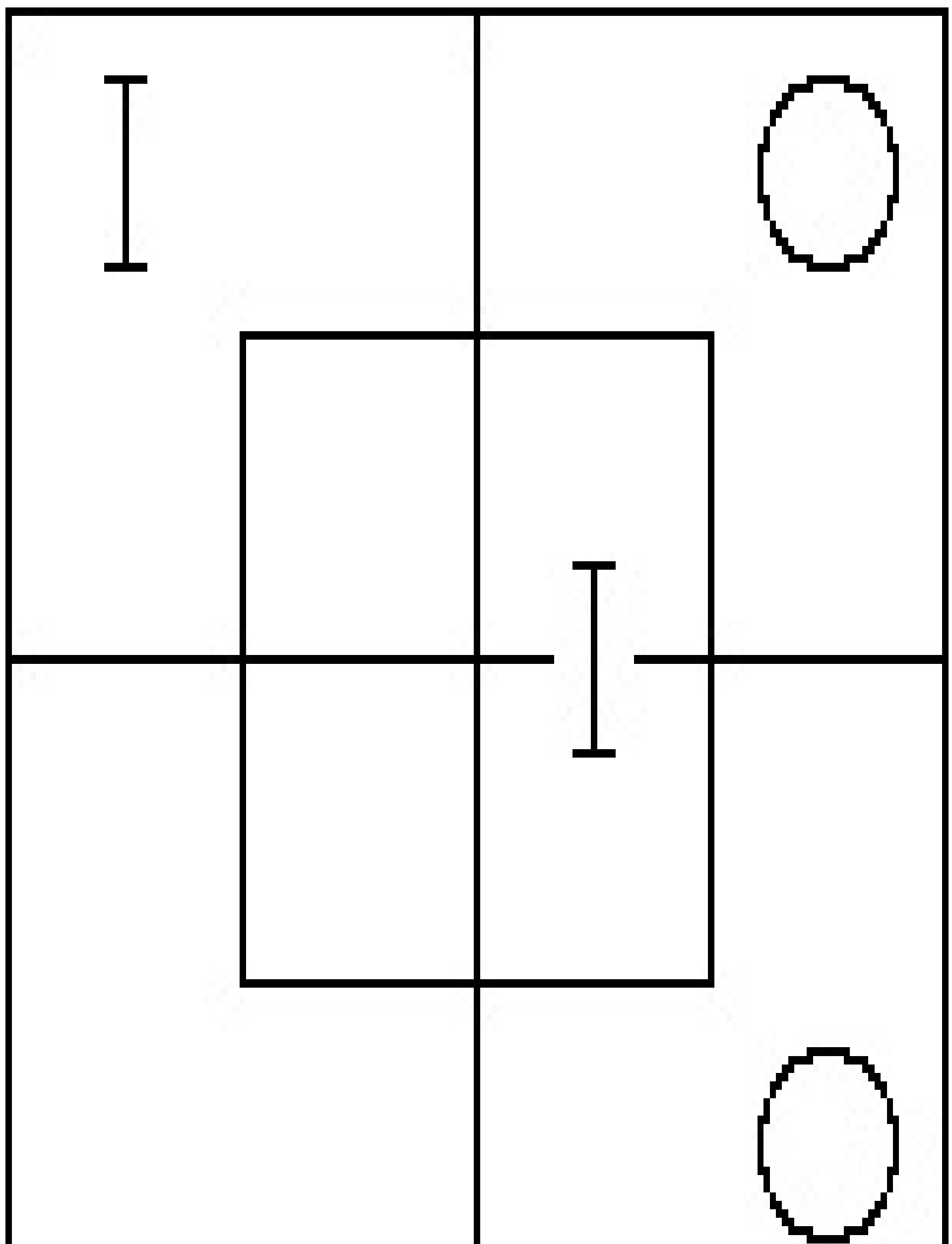
All x are m; No y are m′. No y are x′.



There is no Conclusion.

3.

Some x are m′; All y′ are m. Some x are y.



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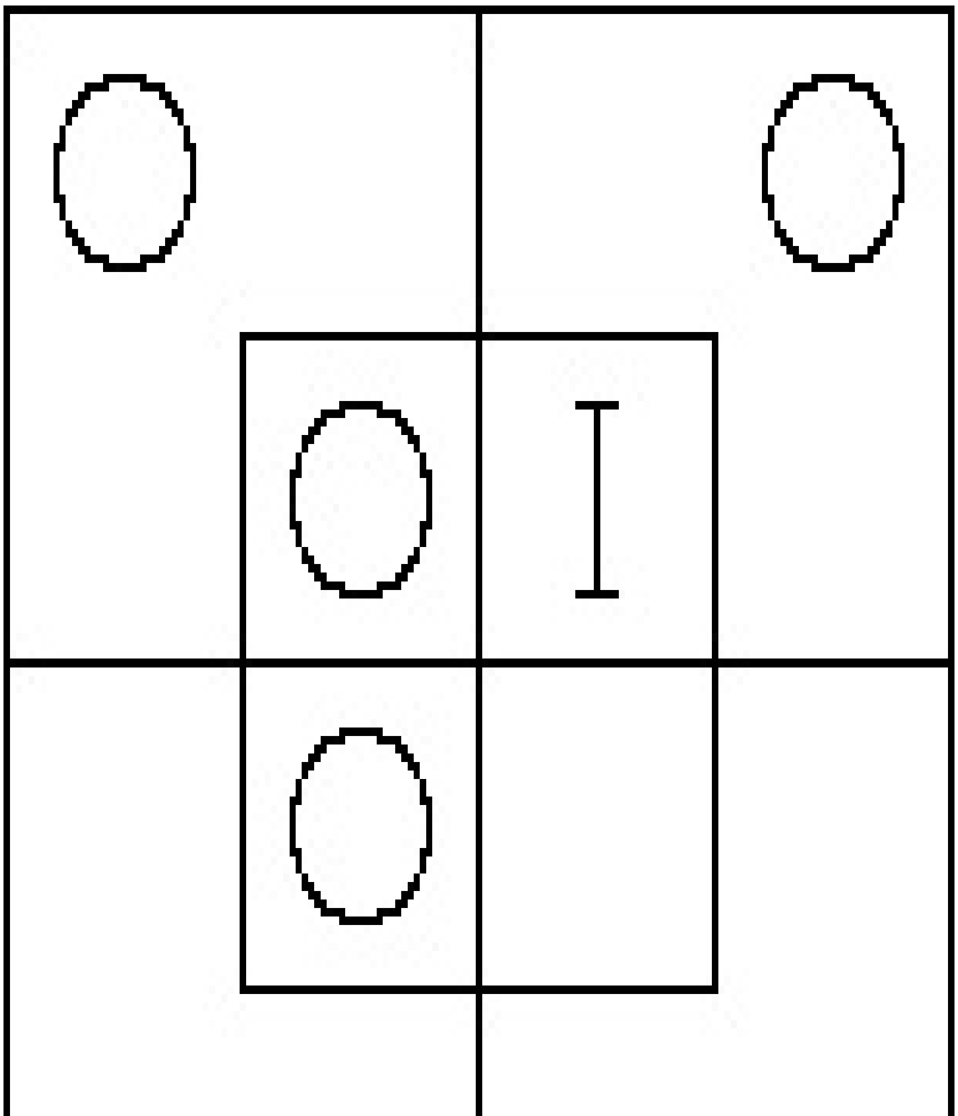
Hence proposed Conclusion is right.

4.

All x are m; No y are m. All x are y′.



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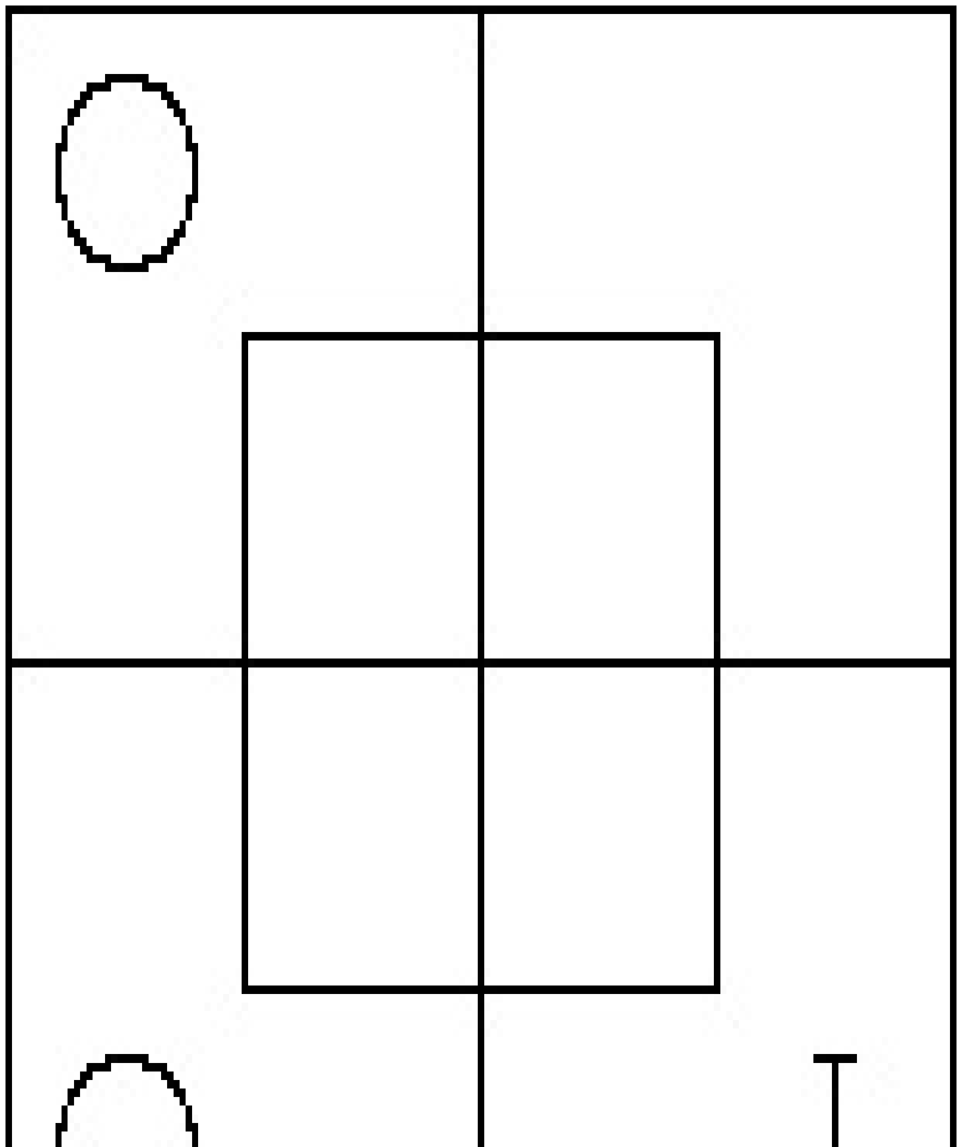
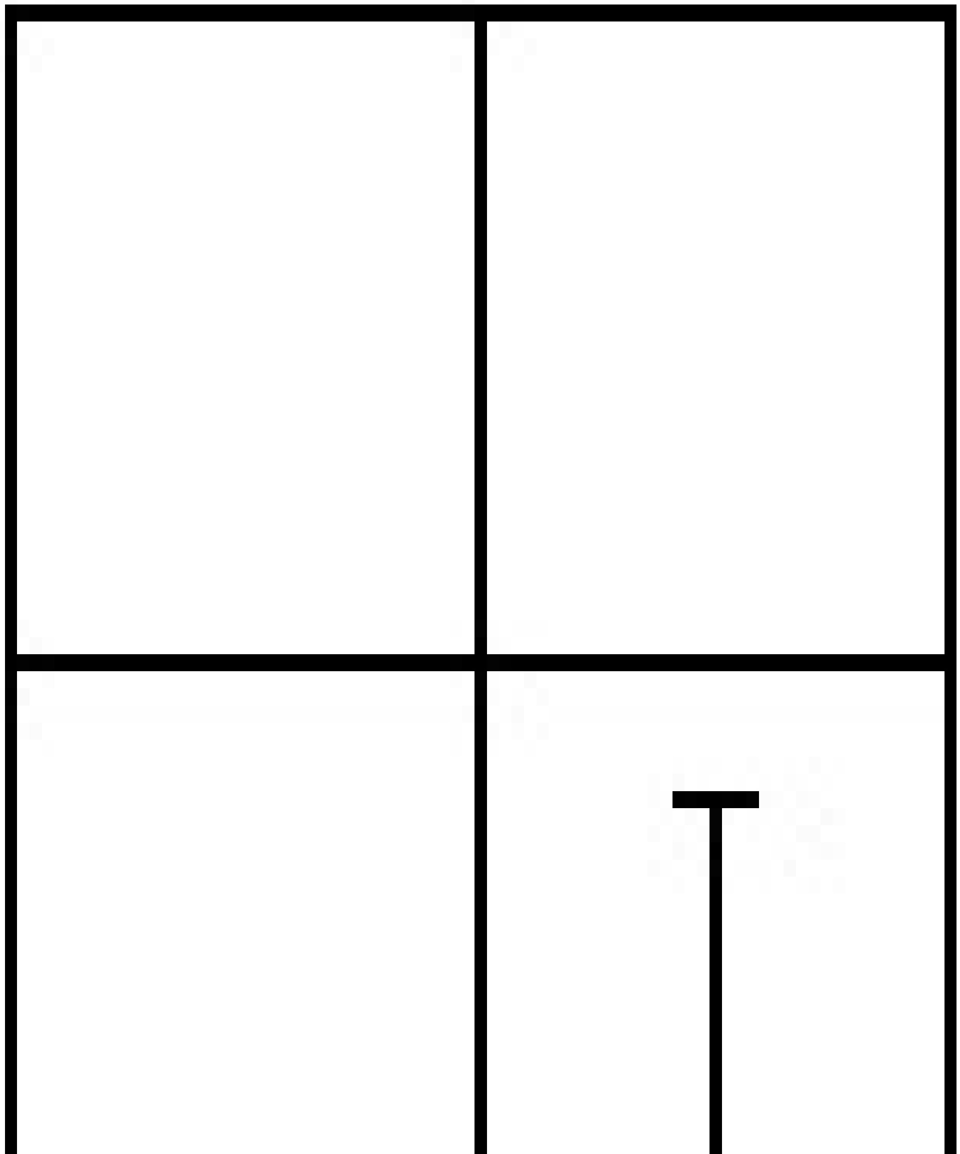
Hence proposed Conclusion is right.

5.

Some m′ are x′; No m′ are y. Some x′ are y′.

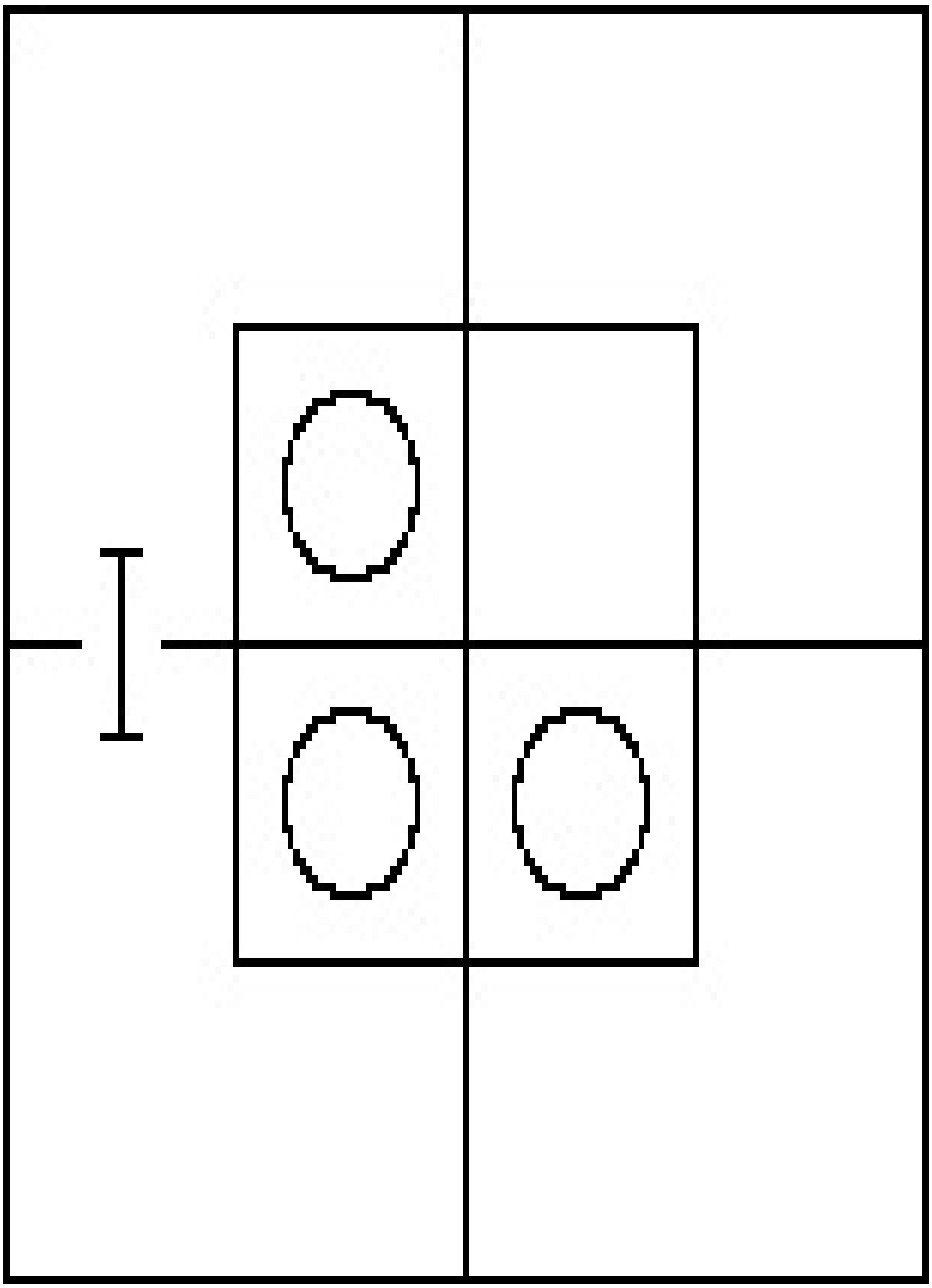




Hence proposed Conclusion is right.

6.

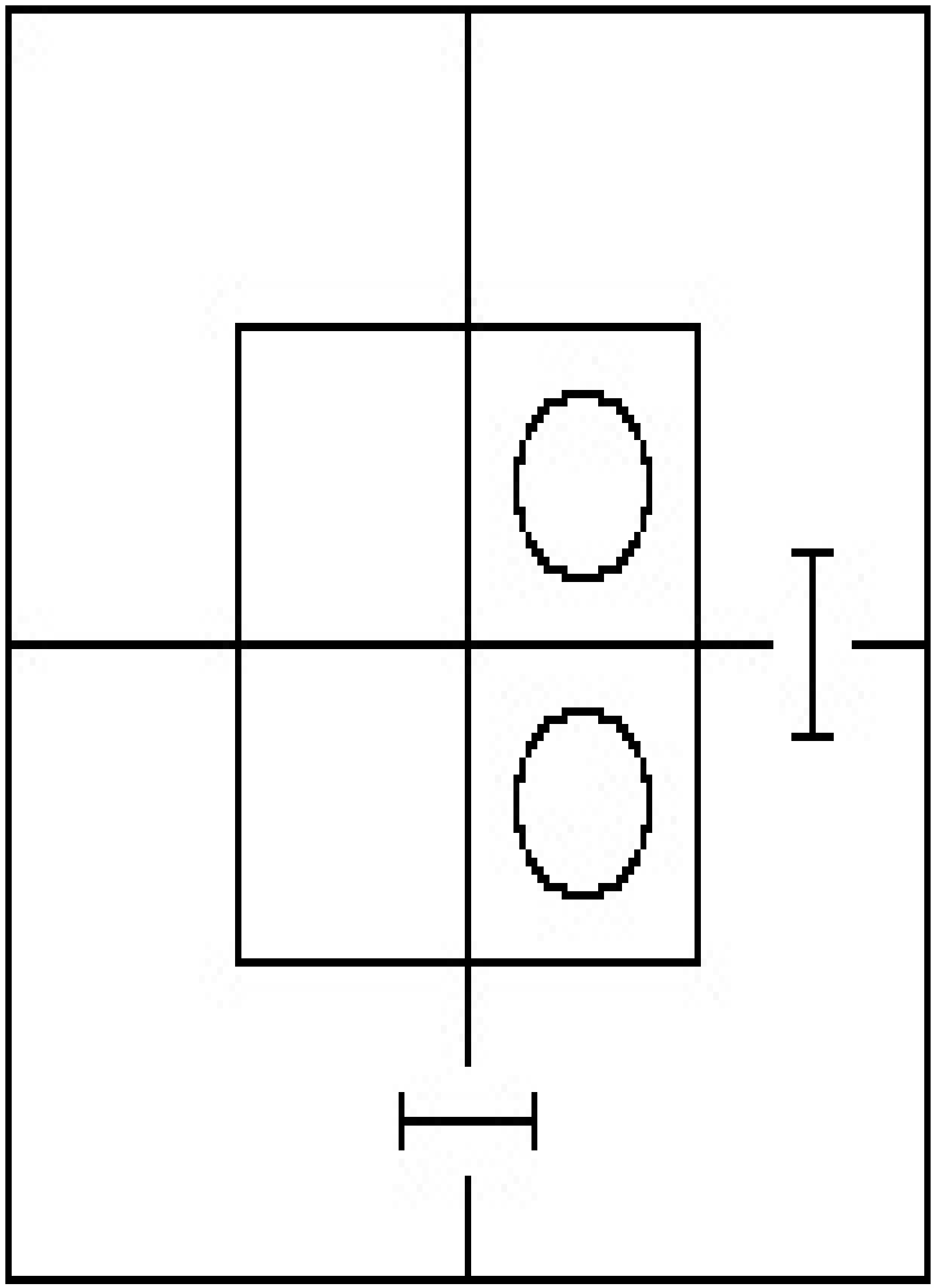
No x' are m; All y are m'. All y are x.



There is no Conclusion.

7.

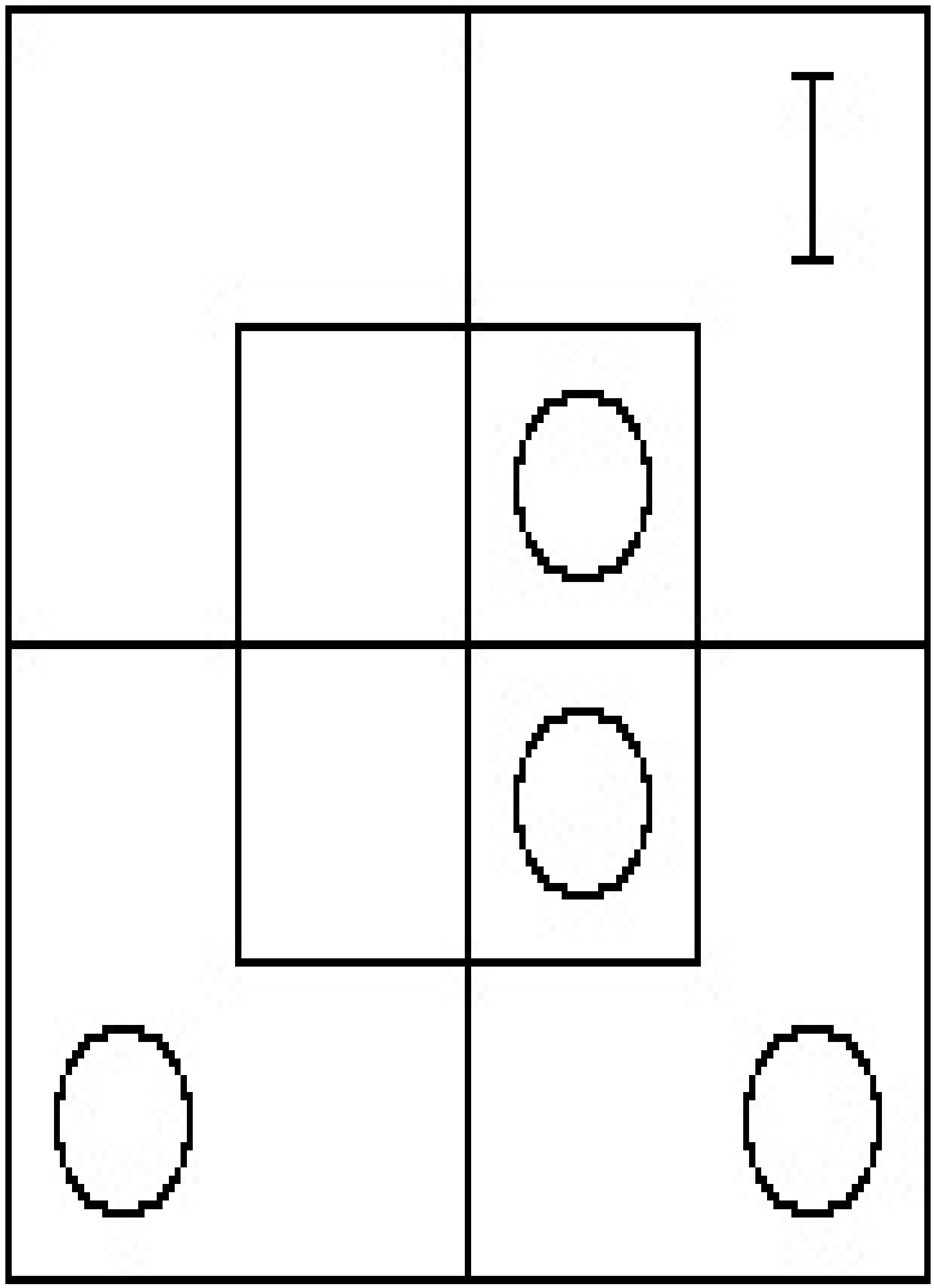
Some m′ are x′; All y′ are m′. Some x′ are y′.



There is no Conclusion.

8.

No m′ are x′; All y′ are m′. All y′ are x.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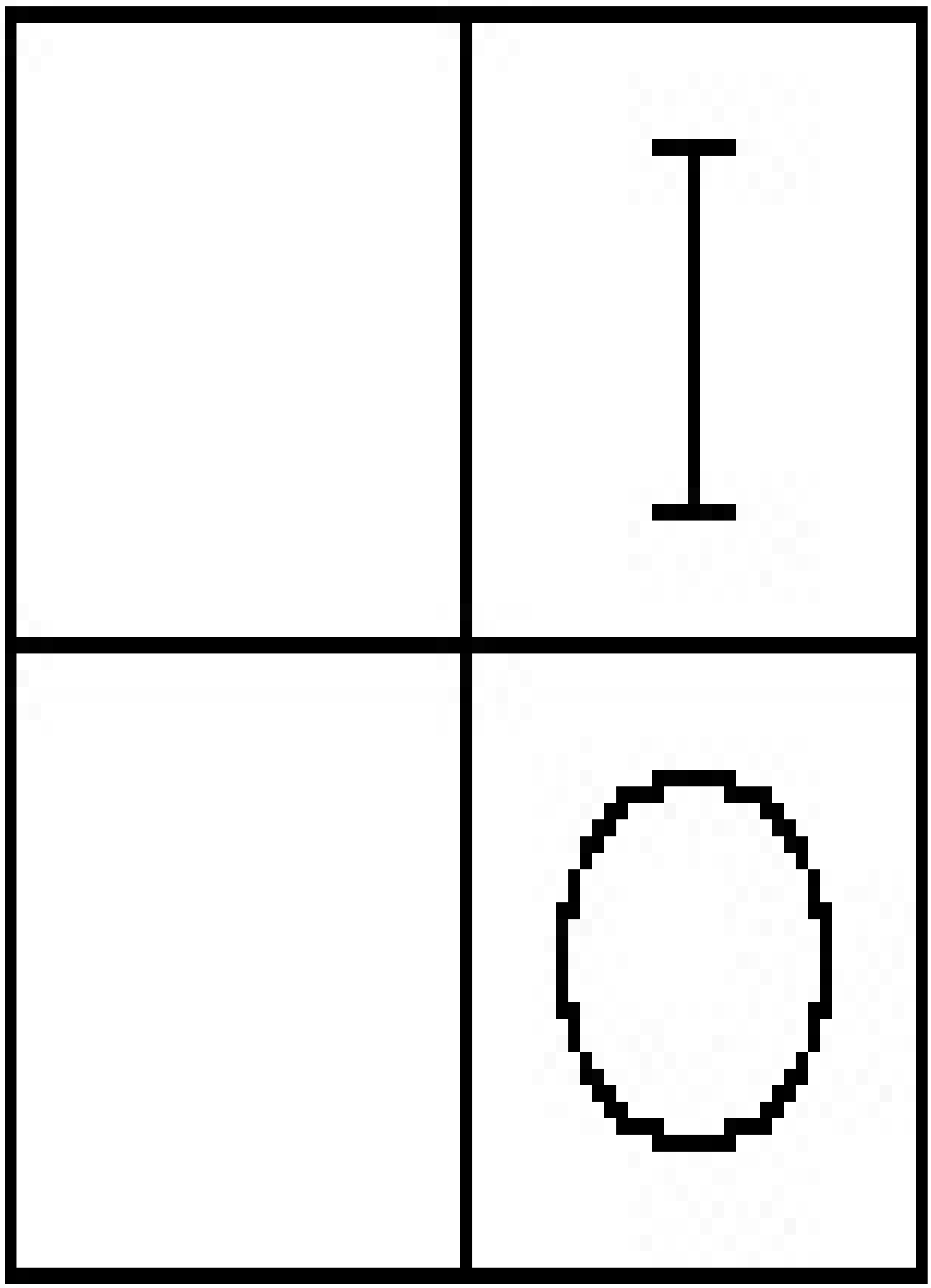
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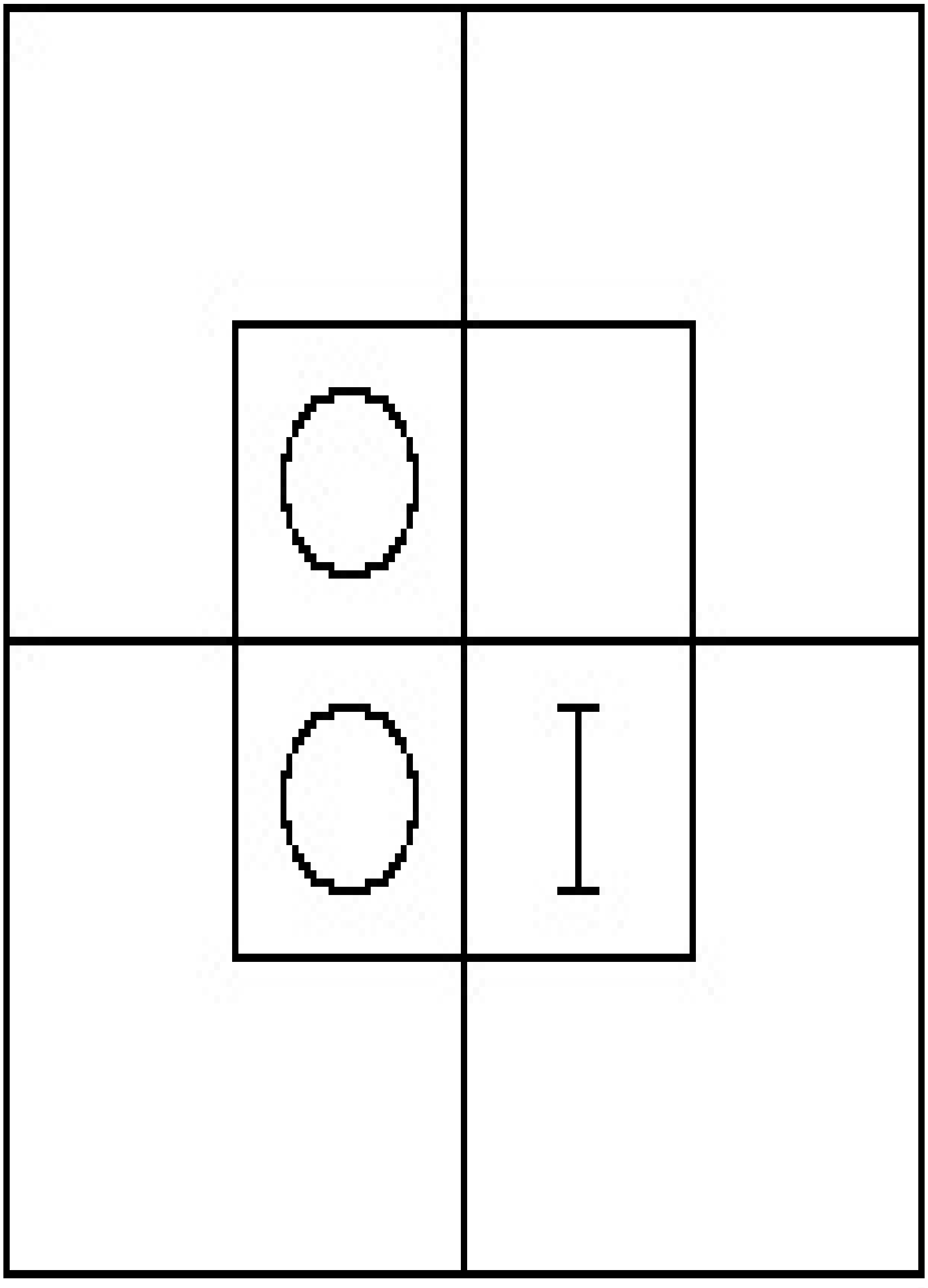
Hence proposed Conclusion is right.

9.

Some m are x′; No m are y. Some x′ are y′.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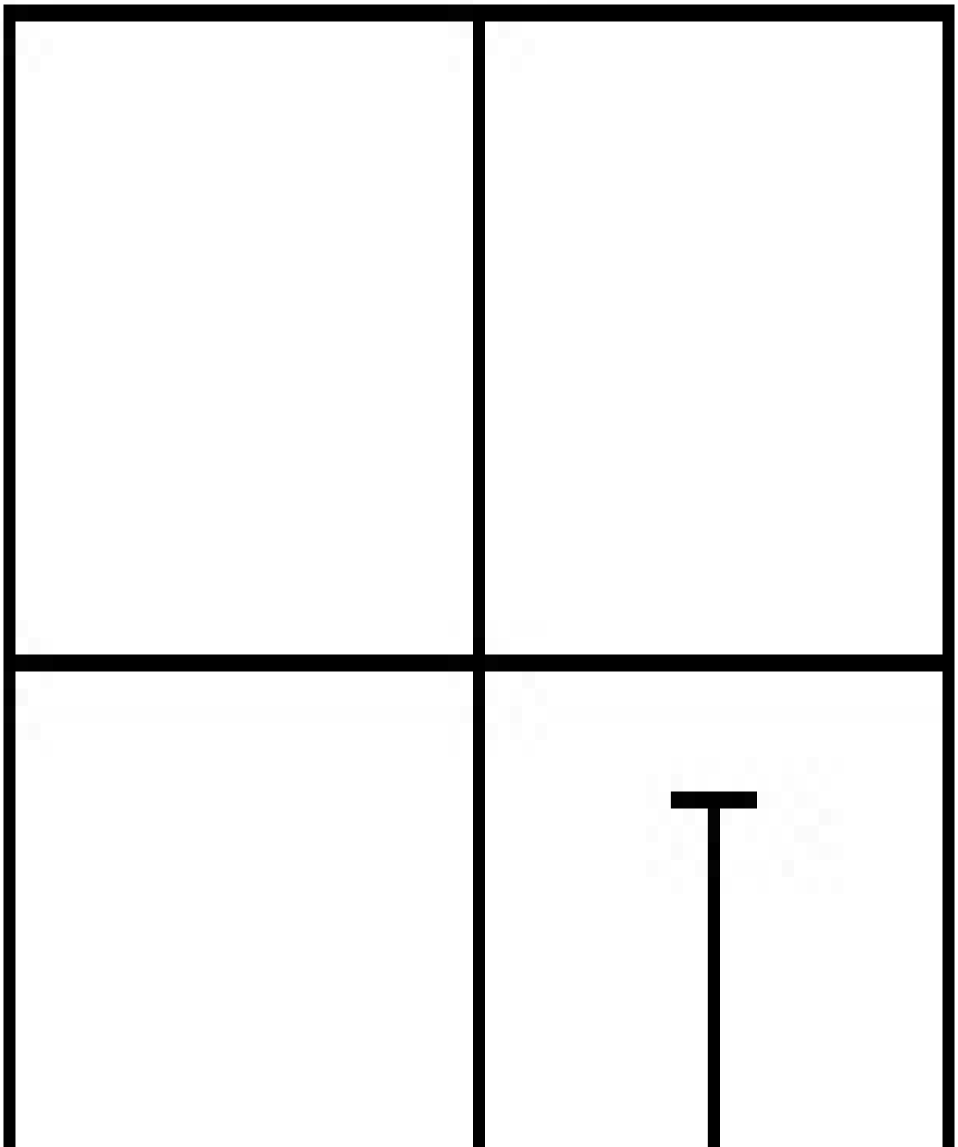
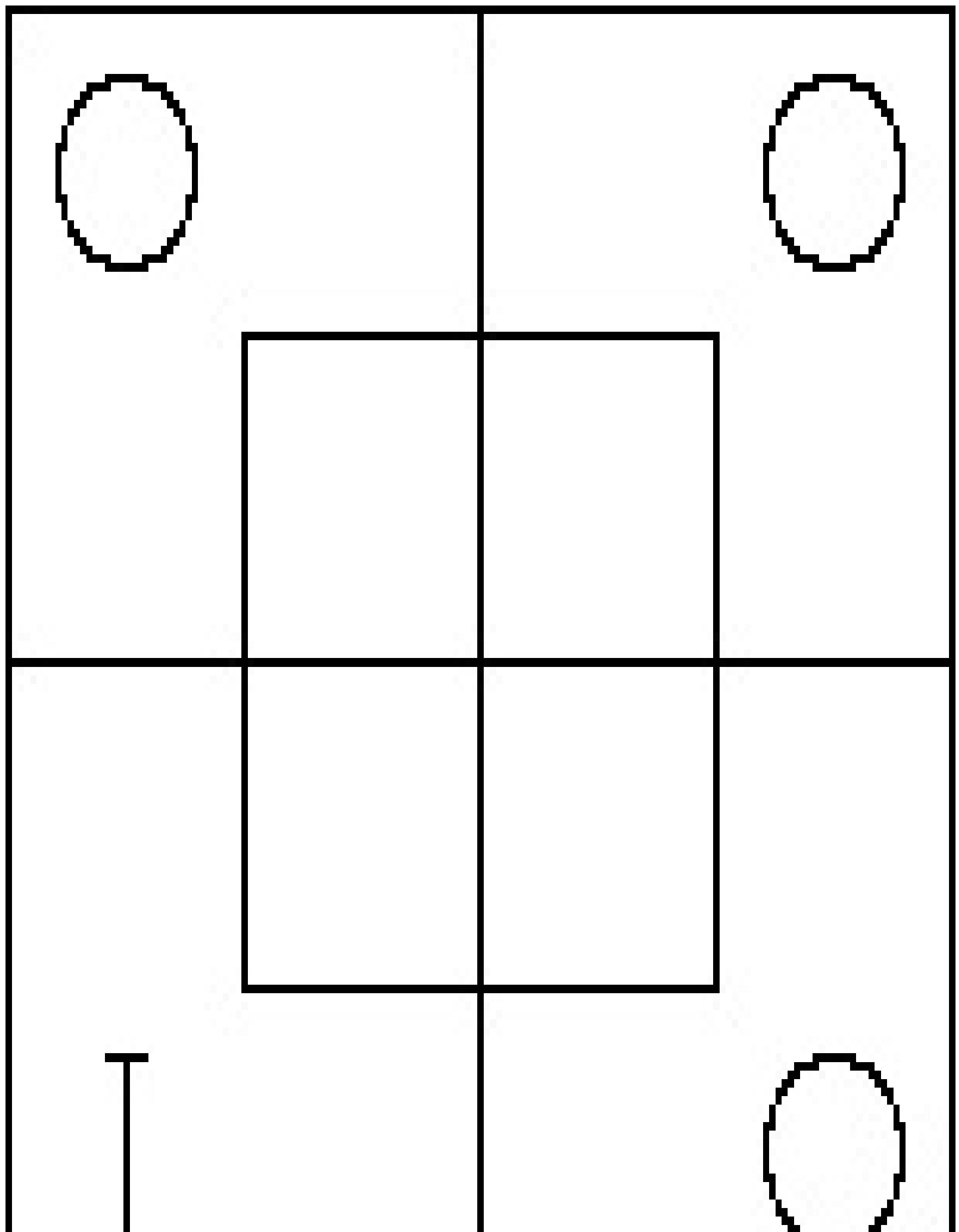
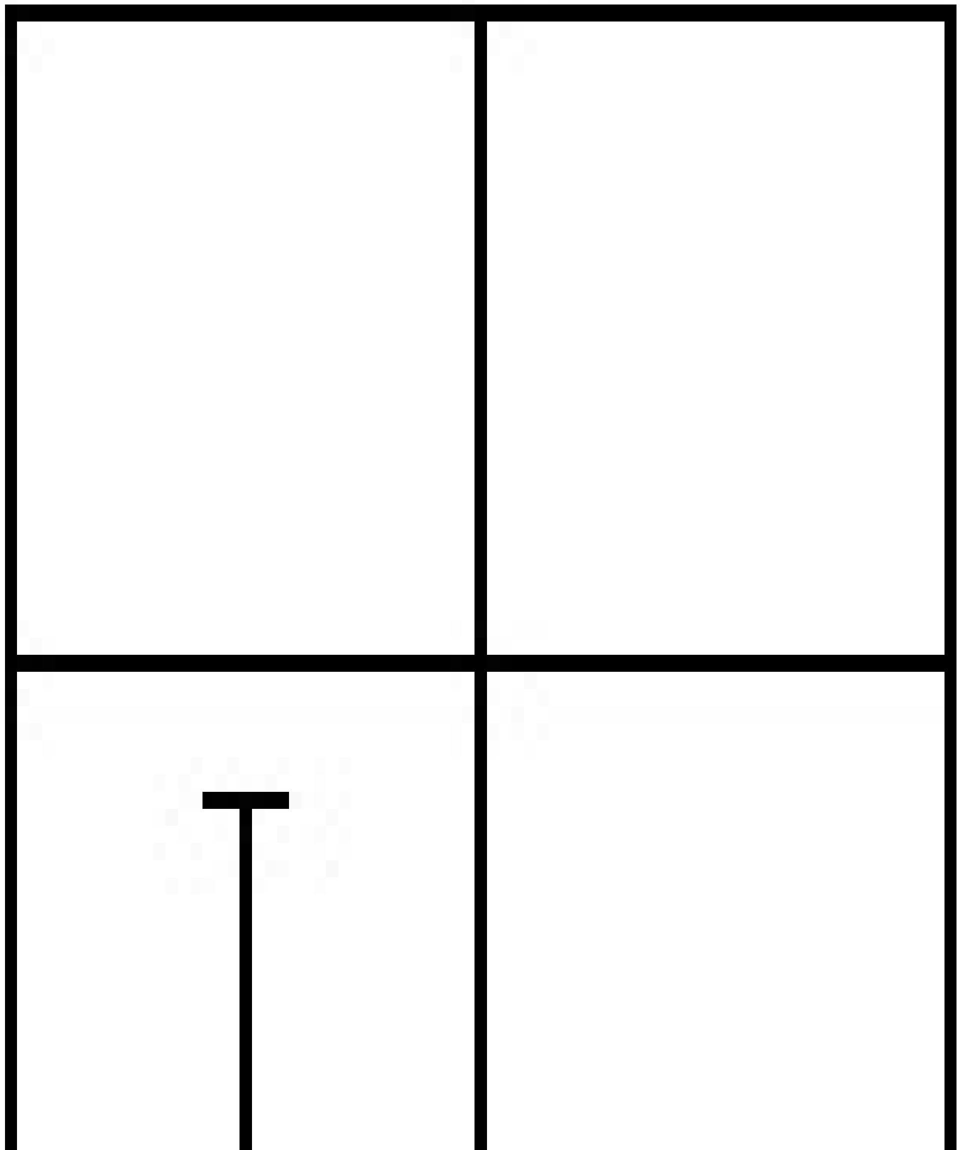


Hence proposed Conclusion is right.

10.

All m′ are x′; All m are y. Some y are x′.





Hence proposed Conclusion is right.

SL7-A

Solutions for § 7, Nos. 1–6.

1.

No doctors are enthusiastic;

You are enthusiastic.

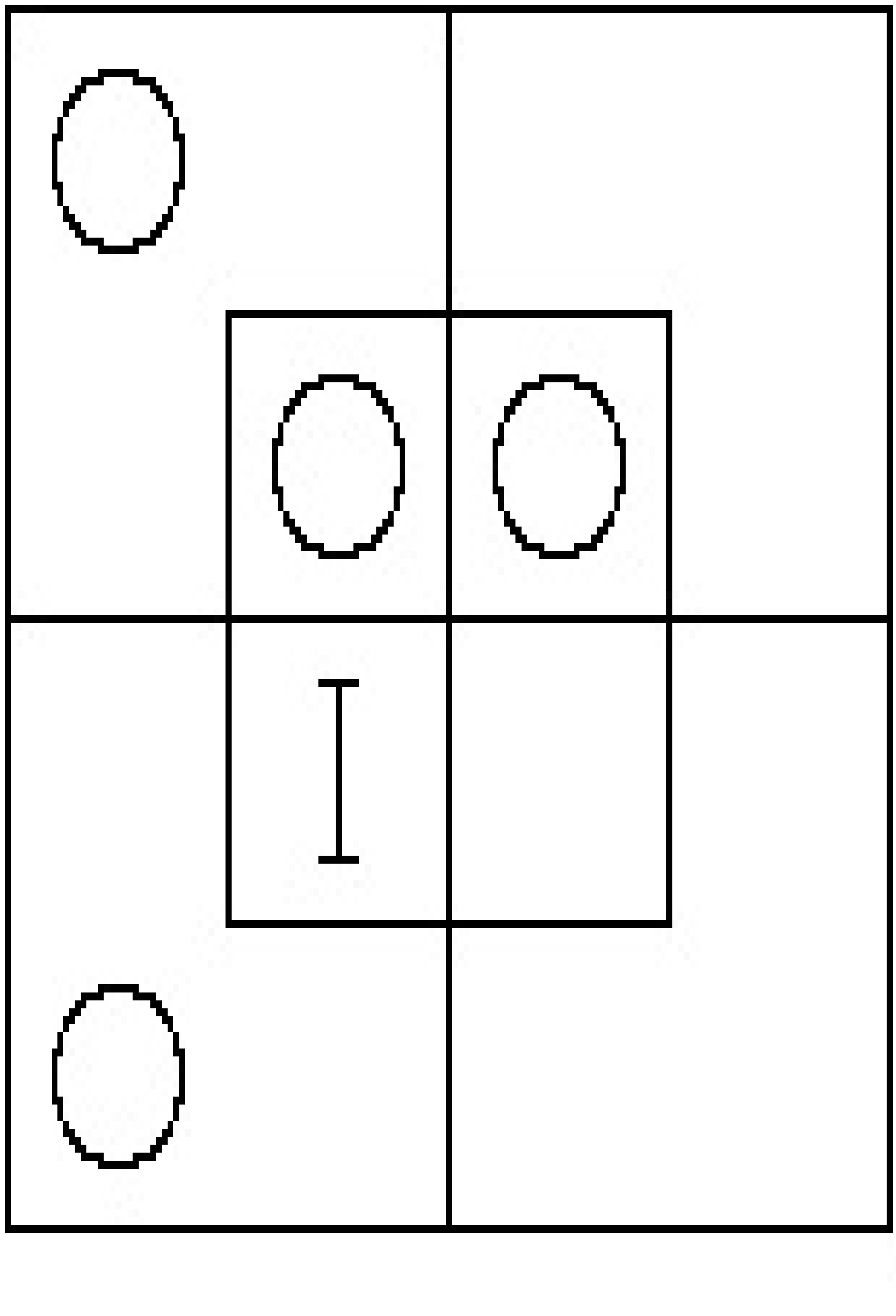
You are not a doctor.

Univ. “persons”; m = enthusiastic; x = doctors; y = you.

No x are m;

All y are m.

All y are x′.



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$\therefore$ All y are x′.

Hence proposed Conclusion is right.

2.

All dictionaries are useful;

Useful books are valuable.

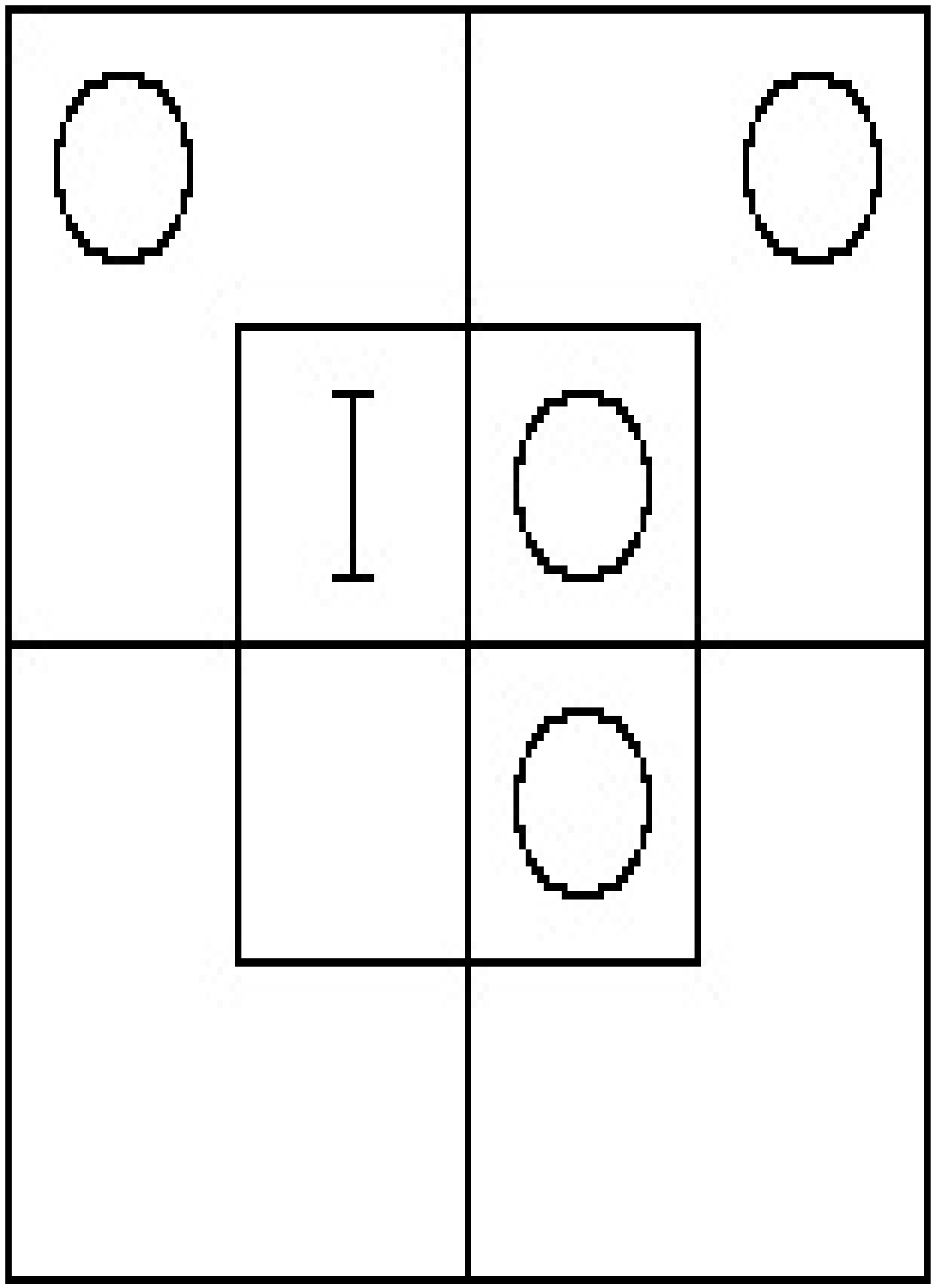
Dictionaries are valuable.

Univ. “books”; m = useful; x = dictionaries; y = valuable.

All x are m;

All m are y.

All x are y.



I O

$\therefore$ All x are y.

Hence proposed Conclusion is right.

3.

No misers are unselfish;

None but misers save egg-shells.

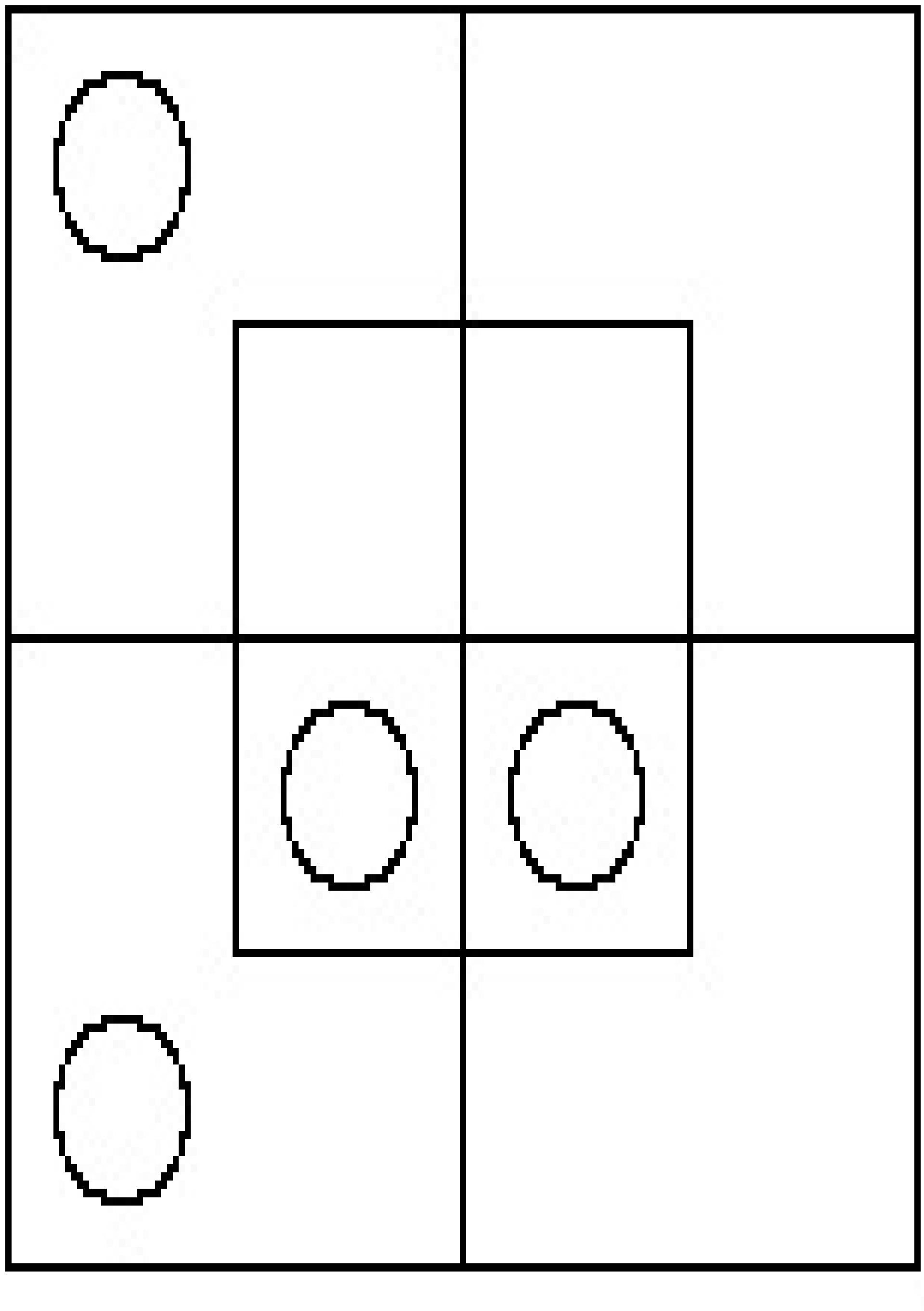
No unselfish people save egg-shells.

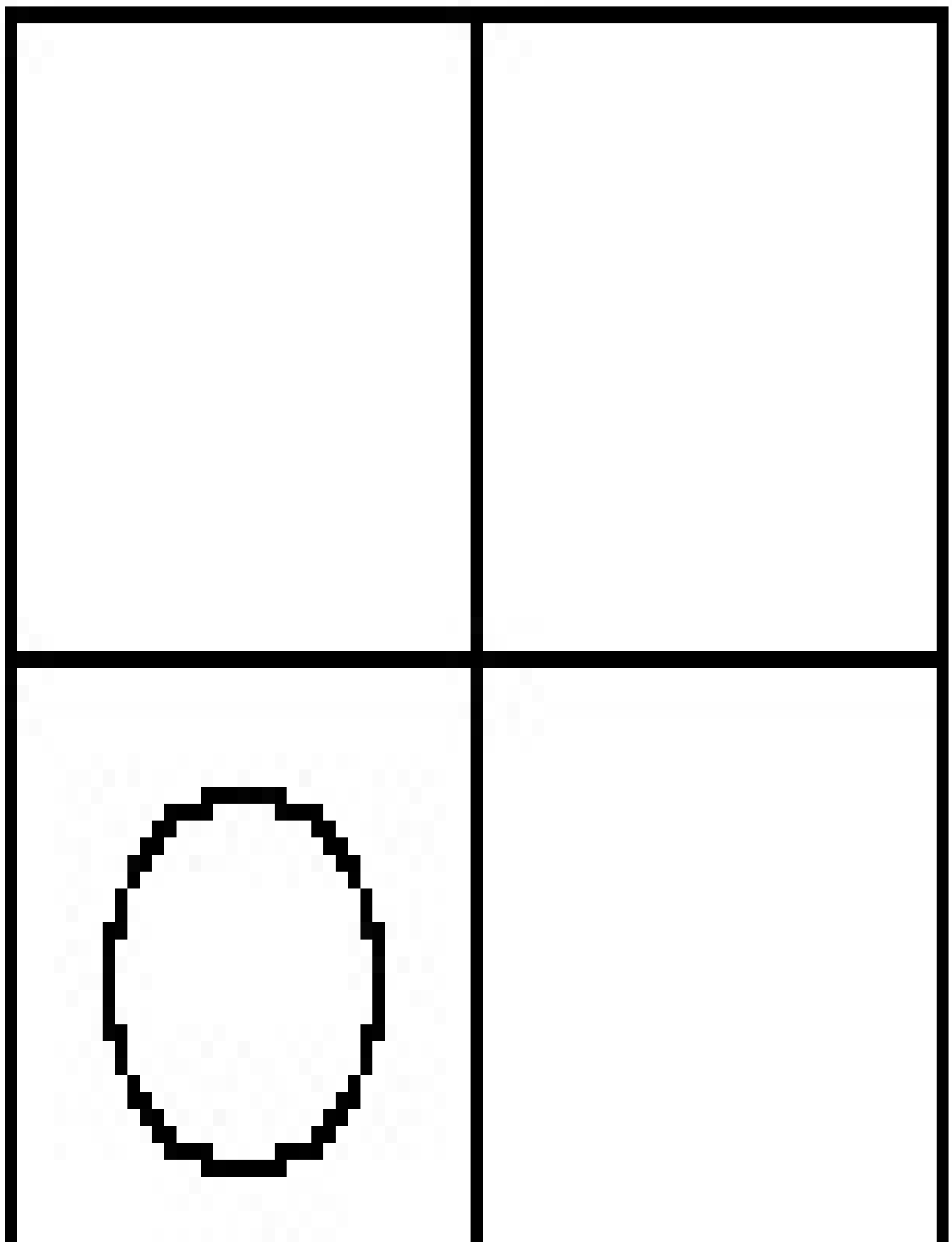
Univ. “people”; m = misers; x = selfish; y = people who save egg-shells.

No m are x′;

No m′ are y.

No x′ are y.





$\therefore$ No x′ are y.

Hence proposed Conclusion is right.

4.

Some epicures are ungenerous;

All my uncles are generous.

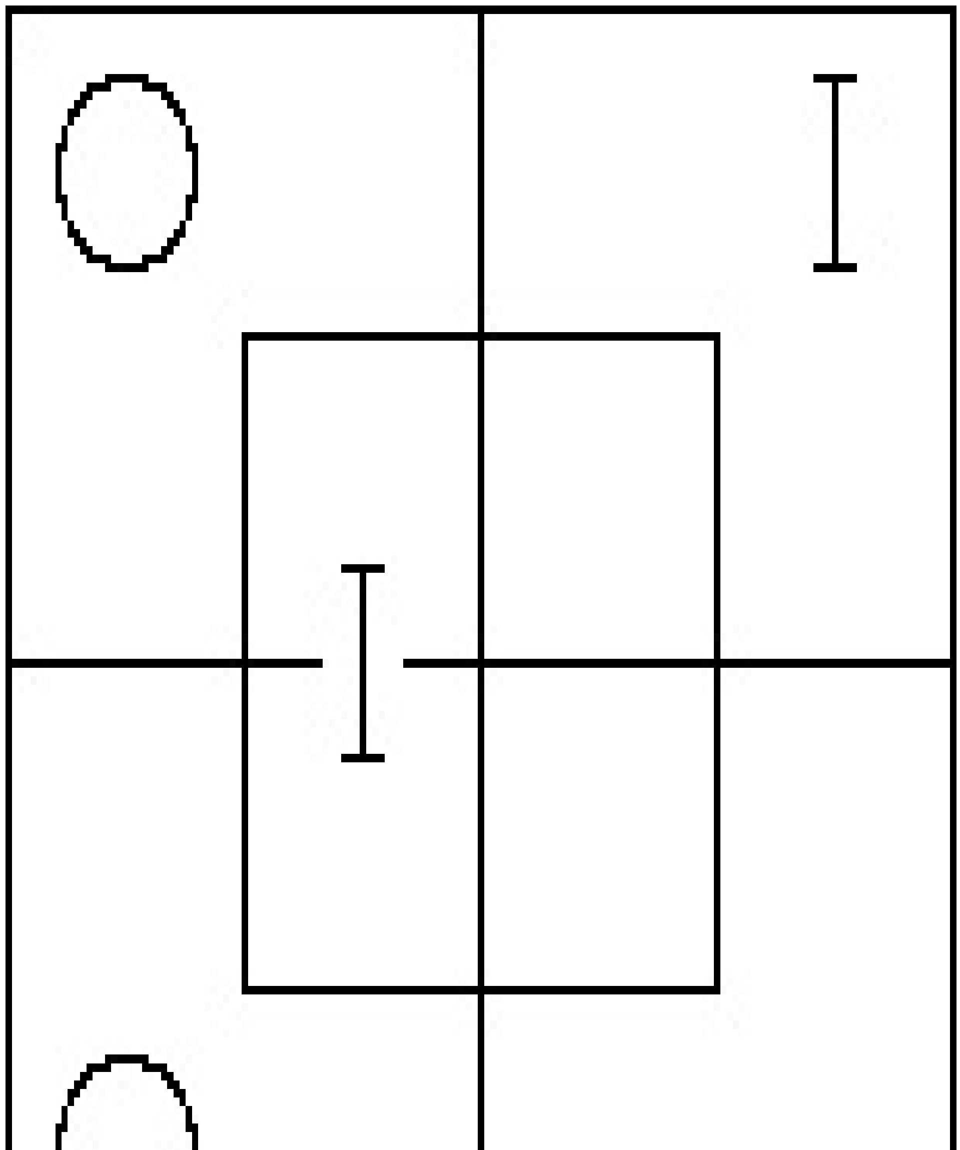
My uncles are not epicures.

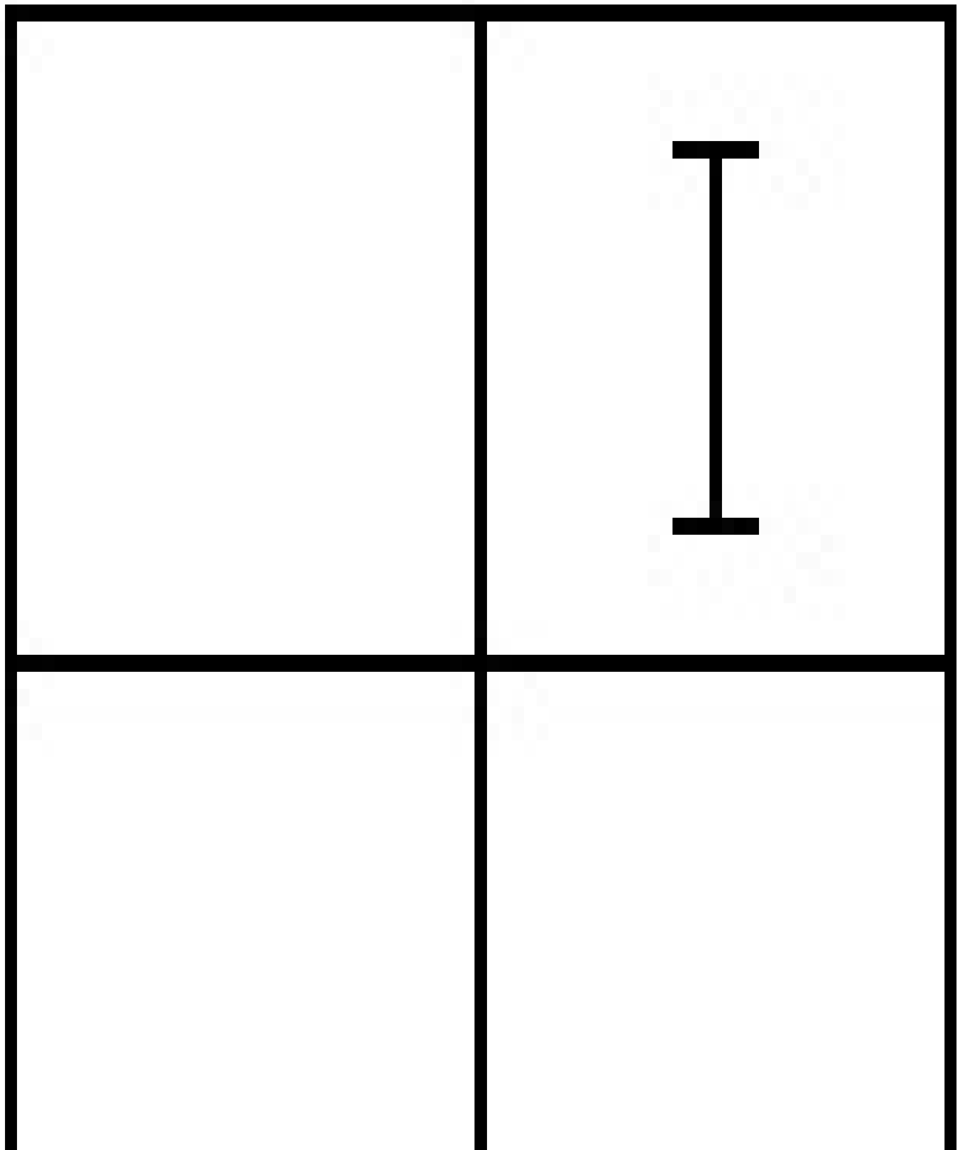
Univ. “persons”; m = generous; x = epicures; y = my uncles.

Some x are m′.

All y are m.

All y are x′.

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$\therefore$ Some x are y′.

Hence proposed Conclusion is wrong, the right one being “Some epicures are not uncles of mine.”

5.

Gold is heavy;

Nothing but gold will silence him.

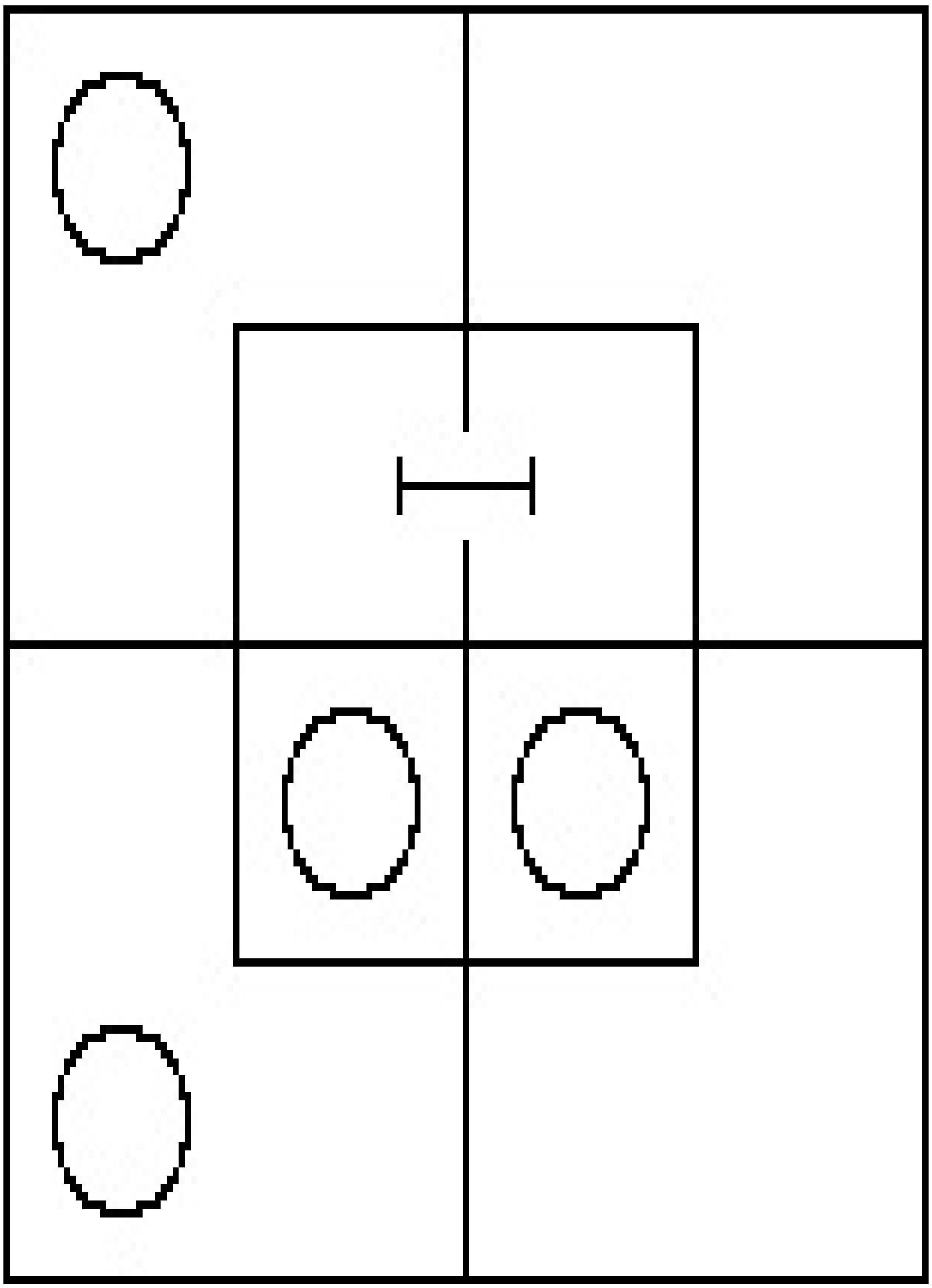
Nothing light will silence him.

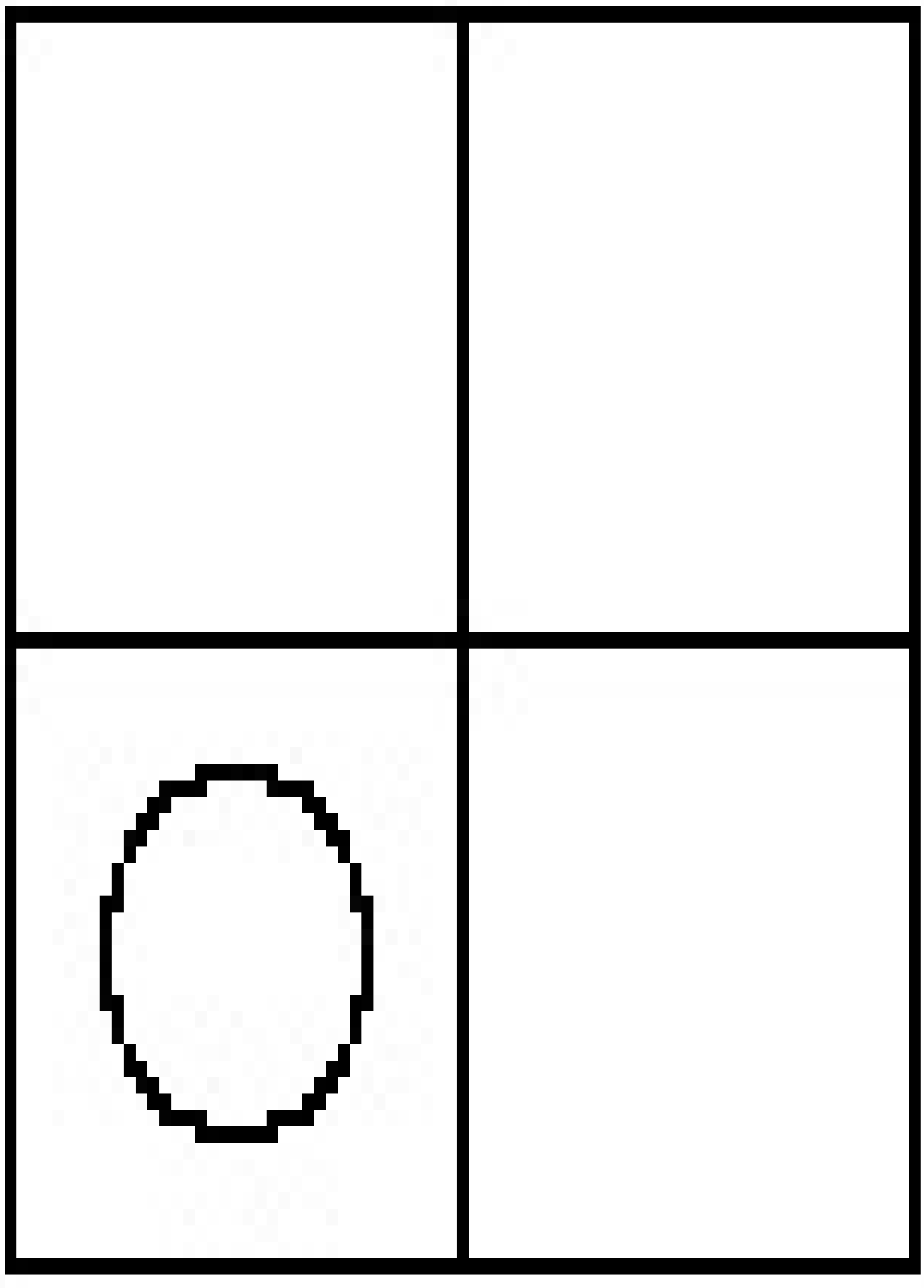
Univ. “things”; m = gold; x = heavy; y = able to silence him.

All m are x;

No m′ are y.

No x′ are y.





$\therefore$ No x′ are y.

Hence proposed Conclusion is right.

6.

Some healthy people are fat;

No unhealthy people are strong.

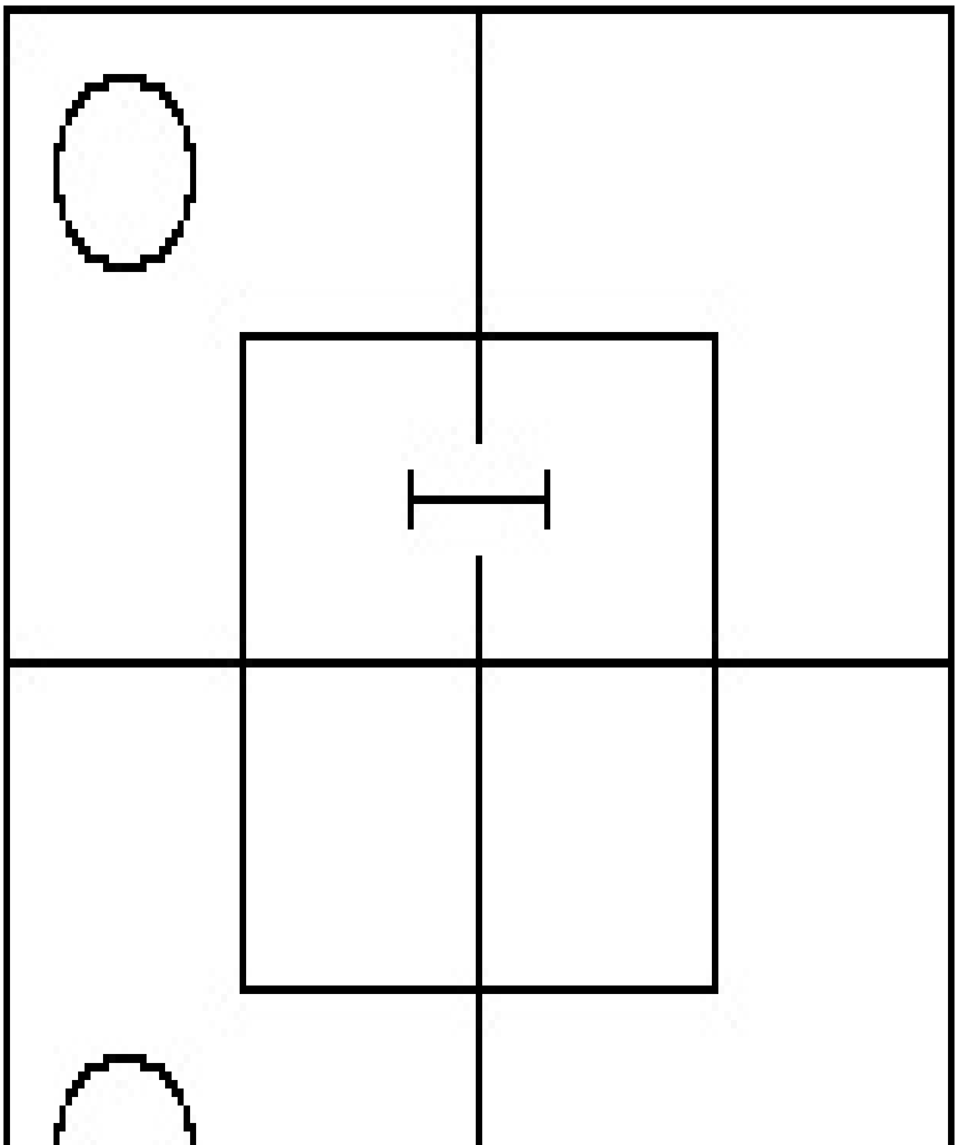
Some fat people are not strong.

Univ. “persons”; m = healthy; x = fat; y = strong.

Some m are x;

No m′ are y.

Some x are y′.



There is no Conclusion.

§ 3.

Method of Subscripts.

SL4-B

Solutions for § 4.

1. mx′0 † m′1y′0 ¶ x′y′0 [Fig. I.

i.e. *“No x′ are y′.”*

2. m′x0 † m′y′1 ¶ x′y′1 [Fig. II.

i.e. *“Some x′ are y′.”*

3. m′1x′0 † m′1y0 ¶ xy′1 [Fig. III.

i.e. *“Some x are y′.”*

4. x′m′0 † y′1m′0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

5. mx′1 † ym0 ¶ x′y′1 [Fig. II.

i.e. “Some x′ are y′.”

6. x′m0 † my0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

7. mx′0 † y′m1 ¶ xy′1 [Fig. II.

i.e. “Some x are y′.”

8. m′1x0 † m′y0 ¶ x′y′1 [Fig. III.

i.e. “Some x′ are y′.”

9. x′m′1 † my0 ¶ nothing.

[Fallacy of Unlike Eliminands with an Entity-Premiss.]

10. x1m′0 † y′1m0 ¶ x1y′0 † y′1x0 [Fig. I (β).

i.e. “All x are y, and all y′ are x′.”

11. mx0 † y′1m0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

12. xm0 † y1m′0 ¶ y1x0 [Fig. I (α).

i.e. “All y are x′.”

13. m′1x′0 † ym0 ¶ x′y0 [Fig. I.

i.e. “No x′ are y.”

14. m1x′0 † m′1y′0 ¶ x′y′0 [Fig. I.

i.e. “No x′ are y′.”

15. xm0 † m′y0 ¶ xy0 [Fig. I.

i.e. “No x are y.”

16. x1m0 † y1m′0 ¶ (x1y0 † y1x0) [Fig. I (β).

i.e. “All x are y′ and all y are x′.”

17. xm0 † m′1y′0 ¶ xy′0 [Fig. I.

i.e. “No x are y′.”

18. xm′0 † my0 ¶ xy0 [Fig. I.

i.e. “No x are y.”

19. m1x′0 † m1y0 ¶ xy′1 [Fig. III.

i.e. “Some x are y′.”

20. mx0 † m′1y′0 ¶ xy′0 [Fig. I.

i.e. “No x are y′.”

21. x1m′0 † m′y1 ¶ x′y1 [Fig. II.

i.e. “Some x′ are y.”

22. xm1 † y1m′0 ¶ nothing.

[Fallacy of Unlike Eliminands with an Entity-Premiss.]

23. m1x′0 † ym1 ¶ xy1 [Fig. II.

i.e. “Some x are y.”

24. xm0 † y1m′0 ¶ y1x0 [Fig. I (α).

i.e. “All y are x′.”

25. mx′1 † my′0 ¶ x′y1 [Fig. II.

i.e. “Some x′ are y.”

26. mx′0 † y1m′0 ¶ y1x′0 [Fig. I (α).

i.e. “All y are x.”

27. x1m0 † y′1m′0 ¶ (x1y′0 † y′1x0) [Fig. I (β).

i.e. “All x are y, and all y′ are x′.”

28. m1x0 † my1 ¶ x′y1 [Fig. II.

i.e. “Some x′ are y.”

29. mx0 † y1m0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

30. x1m0 † ym1 ¶ x′y1 [Fig. II.

i.e. “Some y are x′.”

31. x1m′0 † y1m′0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

32. xm′0 † m1y′0 ¶ xy′0 [Fig. I.

i.e. “No x are y′.”

33. mx0 † my0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

34. mx′0 † ym1 ¶ xy1 [Fig. II.

i.e. “Some x are y.”

35. mx0 † y1m′0 ¶ y1x0 [Fig. I (α).

i.e. “All y are x′.”

36. m1x0 † ym1 ¶ x′y1 [Fig. II.

i.e. “Some x′ are y.”

37. m1x′0 † ym0 ¶ xy′1 [Fig. III.

i.e. “Some x are y′.”

38. mx0 † m′y0 ¶ xy0 [Fig. I.

i.e. “No x are y.”

39. mx′1 † my0 ¶ x′y′1 [Fig. II.

i.e. "Some x′ are y′."

40. x′m0 † y′1m′0 ¶ y′1x′0 [Fig. I (α).

i.e. "All y′ are x."

41. x1m0 † ym′0 ¶ x1y0 [Fig. I (α).

i.e. "All x are y′."

42. m′x0 † ym0 ¶ xy0 [Fig. I.

i.e. "No x are y."

SL5-B

Solutions for § 5, Nos. 13–24.

13. No Frenchmen like plumpudding;

All Englishmen like plumpudding.

Univ. "men"; m = liking plumpudding; x = French; y = English.

xm0 † y1m′0 ¶ y1x0 [Fig. I (α).

i.e. Englishmen are not Frenchmen.

14. No portrait of a lady, that makes her simper or scowl, is satisfactory;

No photograph of a lady ever fails to make her simper or scowl.

Univ. “portraits of ladies”; m = making the subject simper or scowl; x = satisfactory; y = photographic.

mx0 † ym′0 ¶ xy0 [Fig. I.

i.e. No photograph of a lady is satisfactory.

15. All pale people are phlegmatic;

No one looks poetical unless he is pale.

Univ. “people”; m = pale; x = phlegmatic; y = looking poetical.

m1x′0 † m′y0 ¶ x′y0 [Fig. I.

i.e. No one looks poetical unless he is phlegmatic.

16. No old misers are cheerful;

Some old misers are thin.

Univ. “persons”; m = old misers; x = cheerful; y = thin.

mx0 † my1 ¶ x′y1 [Fig. II.

i.e. Some thin persons are not cheerful.

17. No one, who exercises self-control, fails to keep his temper;

Some judges lose their tempers.

Univ. “persons”; m = keeping their tempers; x = exercising self-control; y = judges.

xm′0 † ym′1 ¶ x′y1 [Fig. II.

i.e. Some judges do not exercise self-control.

18. All pigs are fat;

Nothing that is fed on barley-water is fat.

Univ. is “things”; m = fat; x = pigs; y = fed on barley-water.

$x_1 m'_0 \dagger y m_0$ ¶ $x_1 y_0$ [Fig. I (α).

i.e. Pigs are not fed on barley-water.

19. All rabbits, that are not greedy, are black;

No old rabbits are free from greediness.

Univ. is “rabbits”; m = greedy; x = black; y = old.

$m'_1 x'_0 \dagger y m'_0$ ¶ $x y'_1$ [Fig. III.

i.e. Some black rabbits are not old.

20. Some pictures are not first attempts;

No first attempts are really good.

Univ. is “things”; m = first attempts; x = pictures; y = really good.

xm′1 † my0 ¶ nothing.

[Fallacy of Unlike Eliminands with an Entity-Premiss.]

21. I never neglect important business;

Your business is unimportant.

Univ. is “business”; m = important; x = neglected by me; y = your.

mx0 † y1m0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

22. Some lessons are difficult;

What is difficult needs attention.

Univ. is “things”; m = difficult; x = lessons; y = needing attention.

xm1 † m1y′0 ¶ xy1 [Fig. II.

i.e. Some lessons need attention.

23. All clever people are popular;

All obliging people are popular.

Univ. is “people”; m = popular; x = clever; y = obliging.

x1m′0 † y1m′0 ¶ nothing.

[Fallacy of Like Eliminands not asserted to exist.]

24. Thoughtless people do mischief;

No thoughtful person forgets a promise.

Univ. is “persons”; m = thoughtful; x = mischievous; y = forgetful of promises.

m′1x′0 † my0 ¶ x′y0

i.e. No one, who forgets a promise, fails to do mischief.

SL6-B

Solutions for § 6.

1. xm1 † my′0 ¶ xy1 [Fig. II.] Concl. right.

2. x1m′0 † ym′0 Fallacy of Like Eliminands not asserted to exist.

3. xm′1 † y′1m′0 ¶ xy1 [Fig. II.] Concl. right.

4. x1m′0 † ym0 ¶ x1y0 [Fig. I (α).] Concl. right.

5. m′x′1 † m′y0 ¶ x′y′1 [Fig. II.] Concl. right.

6. x′m0 † y1m0 Fallacy of Like Eliminands not asserted to exist.

7. m′x′1 † y′1m0 Fallacy of Unlike Eliminands with an Entity-Premiss.

8. m′x′0 † y′1m0 ¶ y′1x′0 [Fig. I (α).] Concl. right.

9. mx′1 † my0 ¶ x′y′1 [Fig. II.] Concl. right.

10. m′1x0 † m′1y′0 ¶ x′y1 [Fig. III.] Concl. right.

11. x1m0 † ym1 ¶ x′y1 [Fig. II.] Concl. right.

12. xm0 † m′y′0 ¶ xy′0 [Fig. I.] Concl. right.

13. xm0 † y′1m′0 ¶ y′1x0 [Fig. I (α).] Concl. right.

14. m′1x0 † m′1y′0 ¶ x′y1 [Fig. III.] Concl. right.

15. mx′1 † y1m0 ¶ x′y′1 [Fig. II.] Concl. right.

16. x′m0 † y′1m0 Fallacy of Like Eliminands not asserted to exist.

17. m′x0 † m′1y0 ¶ x′y′1 [Fig. III.] Concl. right.

18. x′m0 † my1 ¶ xy1 [Fig. II.] Concl. right.

19. mx′1 † m1y′0 ¶ x′y1 [Fig. II.] Concl. right.

20. x′m′0 † m′y′1 ¶ xy′1 [Fig. II.] Concl. right.

21. mx0 † m1y0 ¶ x′y′1 [Fig. III.] Concl. right.

22. x′1m′0 † ym′1 ¶ xy1 [Fig. II.] Concl. wrong: the right one is “Some x are y.”

23. m1x′0 † m′y′0 ¶ x′y′0 [Fig. I.] Concl. right.

24. x1m0 † m′1y′0 ¶ x1y′0 [Fig. I (α).] Concl. right.

25. xm′0 † m1y′0 ¶ xy′0 [Fig. I.] Concl. right.

26. m1x0 † y1m′0 ¶ y1x0 [Fig. I (α).] Concl. right.

27. x1m′0 † my′0 0¶ x1y′0 [Fig. I (α).] Concl. right.

28. x1m′0 † y′m′0 Fallacy of Like Eliminands not asserted to exist.

29. x′m0 † m′y′0 ¶ x′y′0 [Fig. I.] Concl. right.

30. x1m′0 † m1y0 ¶ x1y0 [Fig. I (α).] Concl. right.

31. x′1m0 † y′m′0 ¶ x′1y′0 [Fig. I (α).] Concl. right.

32. xm0 † y′m′0 ¶ xy′0 [Fig. I.] Concl. right.

33. m1x0 † y′1m′0 ¶ y′1x0 [Fig. I (α).] Concl. right.

34. x1m0 † ym′1 Fallacy of Unlike Eliminands with an Entity-Premiss.

35. xm1 † m1y′0 ¶ xy1 [Fig. II.] Concl. right.

36. m1x0 † y1m′0 ¶ y1x0 [Fig. I (α).] Concl. right.

37. mx′0 † m1y0 ¶ xy′1 [Fig. III.] Concl. right.

38. xm0 † my′0 Fallacy of Like Eliminands not asserted to exist.

39. mx0 † my′1 ¶ x′y′1 [Fig. II.] Concl. right.

40. mx′0 † ym1 ¶ xy1 [Fig. II.] Concl. right.

SL7-B

Solutions for § 7.

1. No doctors are enthusiastic;

You are enthusiastic.

You are not a doctor.

Univ. “persons”; m = enthusiastic; x = doctors; y = you.

xm0 † y1m′0 ¶ y1x0 [Fig. I (α).

Conclusion right.

2. Dictionaries are useful;

All my uncles are generous.

My uncles are not epicures.

Univ. “books”; m = useful; x = dictionaries; y = valuable.

x1m′0 † m1y′0 ¶ x1y′0 [Fig. I (α).

Conclusion right.

3. No misers are unselfish;

None but misers save egg-shells.

No unselfish people save egg-shells.

Univ. “people”; m = misers; x = selfish; y = people who save egg-shells.

$mx'0 † m'y0 ¶ x'y0$ [Fig. I.

Conclusion right.

4. Some epicures are ungenerous;

All my uncles are generous.

My uncles are not epicures.

Univ. “persons”; m = generous; x = epicures; y = my uncles.

$xm'1 † y1m'0 ¶ xy'1$ [Fig. II.

Conclusion wrong: right one is “Some epicures are not uncles of mine.”

5. Gold is heavy;

Nothing but gold will silence him.

Nothing light will silence him.

Univ. “things”; m = gold; x = heavy; y = able to silence him.

m1x′0 † m′y0 ¶ x′y0 [Fig. I.

Conclusion right.

6. Some healthy people are fat;

No unhealthy people are strong.

Some fat people are not strong.

Univ. “people”; m = healthy; x = fat; y = strong.

mx1 † m′y0

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

7. I saw it in a newspaper;

All newspapers tell lies.

It was a lie.

Univ. “publications”; m = newspapers; x = publications in which I saw it; y = telling lies.

x1m′0 † m1y′0 ¶ x1y′0 [Fig. I (α).

Conclusion wrong: right one is “The publication, in which I saw it, tells lies.”

8. Some cravats are not artistic;

I admire anything artistic.

There are some cravats that I do not admire.

Univ. “things”; m = artistic; x = cravats; y = things that I admire.

xm1 † m1y0

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

9. His songs never last an hour.

A song, that lasts an hour, is tedious.

His songs are never tedious.

Univ. “songs”; m = lasting an hour; x = his; y = tedious.

$x_1 m_0$ † $m_1 y'_0$ ¶ $x' y_1$ [Fig. III.

Conclusion wrong: right one is “Some tedious songs are not his.”

10. Some candles give very little light;

Candles are meant to give light.

Some things, that are meant to give light, give very little.

Univ. “things”; m = candles; x = giving &c.; y = meant &c.

$m x_1$ † $m_1 y'_0$ ¶ $x y_1$ [Fig. II.

Conclusion right.

11. All, who are anxious to learn, work hard.

Some of these boys work hard.

Some of these boys are anxious to learn.

Univ. “persons”; m = hard-working; x = anxious to learn; y = these boys.

x1m′0 † ym1

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

12. All lions are fierce;

Some lions do not drink coffee.

Some creatures that drink coffee are not fierce.

Univ. “creatures”; m = lions; x = fierce; y = creatures that drink coffee.

m1x′0 † my′1 ¶ xy′1 [Fig. II.

Conclusion wrong: right one is “Some fierce creatures do not drink coffee.”

13. No misers are generous;

Some old men are ungenerous.

Some old men are misers.

Univ. “persons”; m = generous; x = misers; y = old men.

xm0 † ym′1

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

14. No fossil can be crossed in love;

An oyster may be crossed in love.

Oysters are not fossils.

Univ. “things”; m = things that can be crossed in love; x = fossils; y = oysters.

xm0 † y1m′0 ¶ y1x0 [Fig. I (α).

Conclusion right.

15. All uneducated people are shallow;

Students are all educated.

No students are shallow.

Univ. “people”; m = educated; x = shallow; y = students.

m′1x′0 † y1m′0 ¶ xy′1 [Fig. III.

Conclusion wrong: right one is “Some shallow people are not students.”

16. All young lambs jump;

No young animals are healthy, unless they jump.

All young lambs are healthy.

Univ. “young animals”; m = young animals that jump; x = lambs; y = healthy.

x1m′0 † m′y0

No Conclusion. [Fallacy of Like Eliminands not asserted to exist.]

17. Ill-managed business is unprofitable;

Railways are never ill-managed.

All railways are profitable.

Univ. “business”; m = ill-managed; x = profitable; y = railways.

m1x0 † y1m0 ¶ x′y′1 [Fig. III.

Conclusion wrong: right one is “Some business, other than railways, is profitable.”

18. No Professors are ignorant;

All ignorant people are vain.

No Professors are vain.

Univ. “people”; m = ignorant; x = Professors; y = vain.

xm0 † m1y′0 ¶ x′y1 [Fig. III.

Conclusion wrong: right one is “Some vain persons are not Professors.”

19. A prudent man shuns hyænas.

No banker is imprudent.

No banker fails to shun hyænas.

Univ. “men”; m = prudent; x = shunning hyænas; y = bankers.

m1x′0 † ym′0 ¶ x′y0 [Fig. I.

Conclusion right.

20. All wasps are unfriendly;

No puppies are unfriendly.

No puppies are wasps.

Univ. “creatures”; m = friendly; x = wasps; y = puppies.

x1m0 † ym′0 ¶ x1y0 [Fig. I (α).

Conclusion incomplete: complete one is “Wasps are not puppies”.

21. No Jews are honest;

Some Gentiles are rich.

Some rich people are dishonest.

Univ. “persons”; m = Jews; x = honest; y = rich.

mx0 † m′y1

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

22. No idlers win fame;

Some painters are not idle.

Some painters win fame.

Univ. “persons”; m = idlers; x = persons who win fame; y = painters.

mx0 † ym′1

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

23. No monkeys are soldiers;

All monkeys are mischievous.

Some mischievous creatures are not soldiers.

Univ. “creatures”; m = monkeys; x = soldiers; y = mischievous.

mx0 † m1y′0 ¶ x′y1 [Fig. III.

Conclusion right.

24. All these bonbons are chocolate-creams;

All these bonbons are delicious.

Chocolate-creams are delicious.

Univ. “food”; m = these bonbons; x = chocolate-creams; y = delicious.

m1x′0 † m1y′0 ¶ xy1 [Fig. III.

Conclusion wrong, being in excess of the right one, which is “Some chocolate-creams are delicious.”

25. No muffins are wholesome;

All buns are unwholesome.

Buns are not muffins.

Univ. “food”; m = wholesome; x = muffins; y = buns.

xm0 † y1m0

No Conclusion. [Fallacy of Like Eliminands not asserted to exist.]

26. Some unauthorised reports are false;

All authorised reports are trustworthy.

Some false reports are not trustworthy.

Univ. “reports”; m = authorised; x = true; y = trustworthy.

m′x′1 † m1y′0

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

27. Some pillows are soft;

No pokers are soft.

Some pokers are not pillows.

Univ. “things”; m = soft; x = pillows; y = pokers.

xm1 † ym0 ¶ xy′1 [Fig. II.

Conclusion wrong: right one is “Some pillows are not pokers.”

28. Improbable stories are not easily believed;

None of his stories are probable.

None of his stories are easily believed.

Univ. “stories”; m = probable; x = easily believed; y = his.

m′1x0 † ym0 ¶ xy0 [Fig. I.

Conclusion right.

29. No thieves are honest;

Some dishonest people are found out.

Some thieves are found out.

Univ. “people”; m = honest; x = thieves; y = found out.

xm0 † m′y1

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

30. No muffins are wholesome;

All puffy food is unwholesome.

All muffins are puffy.

Univ. is “food”; m = wholesome; x = muffins; y = puffy.

xm0 † y1m0

No Conclusion. [Fallacy of Like Eliminands not asserted to exist.]

31. No birds, except peacocks, are proud of their tails;

Some birds, that are proud of their tails, cannot sing.

Some peacocks cannot sing.

Univ. “birds”; m = proud of their tails; x = peacocks; y = birds that cannot sing.

x′m0 † my′1 ¶ xy′1 [Fig. II.

Conclusion right.

32. Warmth relieves pain;

Nothing, that does not relieve pain, is useful in toothache.

Warmth is useful in toothache.

Univ. “applications”; m = relieving pain; x = warmth; y = useful in toothache.

$x_1 m'_0 \dagger m'y_0$

No Conclusion. [Fallacy of Like Eliminands not asserted to exist.]

33. No bankrupts are rich;

Some merchants are not bankrupts.

Some merchants are rich.

Univ. “persons”; m = bankrupts; x = rich; y = merchants.

$mx_0 \dagger ym'_1$

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

34. Bores are dreaded;

No bore is ever begged to prolong his visit.

No one, who is dreaded, is ever begged to prolong his visit.

Univ. “persons”; m = bores; x = dreaded; y = begged to prolong their visits.

m1x′0 † my0 ¶ xy′1 [Fig. III.

Conclusion wrong: the right one is “Some dreaded persons are not begged to prolong their visits.”

35. All wise men walk on their feet;

All unwise men walk on their hands.

No man walks on both.

Univ. “men”; m = wise; x = walking on their feet; y = walking on their hands.

m1x′0 † m′1y′0 ¶ x′y′0 [Fig. I.

Conclusion wrong: right one is “No man walks on neither.”

36. No wheelbarrows are comfortable;

No uncomfortable vehicles are popular.

No wheelbarrows are popular.

Univ. “vehicles”; m = comfortable; x = wheelbarrows; y = popular.

xm0 † m′x0 ¶ xy0 [Fig. I.

Conclusion right.

37. No frogs are poetical;

Some ducks are unpoetical.

Some ducks are not frogs.

Univ. “creatures”; m = poetical; x = frogs; y = ducks.

xm0 † ym′1

No Conclusion. [Fallacy of Unlike Eliminands with an Entity-Premiss.]

38. No emperors are dentists;

All dentists are dreaded by children.

No emperors are dreaded by children.

Univ. “persons”; m = dentists; x = emperors; y = dreaded by children.

$xm_0 \dagger m_1y'_0$ ¶ $x'y_1$ [Fig. III.

Conclusion wrong: right one is “Some persons, dreaded by children, are not emperors.”

39. Sugar is sweet;

Salt is not sweet.

Salt is not sugar.

Univ. “things”; m = sweet; x = sugar; y = salt.

$x_1m'_0 \dagger y_1m_0$ ¶ $(x_1y_0 \dagger y_1x_0)$ [Fig. I (β).

Conclusion incomplete: omitted portion is “Sugar is not salt.”

40. Every eagle can fly;

Some pigs cannot fly.

Some pigs are not eagles.

Univ. "creatures"; m = creatures that can fly; x = eagles; y = pigs.

$x_1 m'_0$ † $y m'_1$ ¶ $x' y_1$ [Fig. II.

Conclusion right.

SL8

Solutions for § 8.

1. $\overset{1}{cd_0} \dagger \overset{2}{a_1d'_0} \dagger \overset{3}{b_1c'_0}$; $\qquad \overset{1}{\underline{cd}} \dagger \overset{2}{a\underline{\underline{d'}}} \dagger \overset{3}{b\underline{\underline{c'}}} \quad \P\, ab_0 \dagger a_1 \dagger b_1$

i.e. $\P\, a_1b_0 \dagger b_1a_0$

2. $\overset{1}{d_1b'_0} \dagger \overset{2}{ac'_0} \dagger \overset{3}{bc_0}$; $\qquad \overset{1}{\underline{db'}} \dagger \overset{3}{\underline{\underline{b}}c} \dagger \overset{2}{a\underline{\underline{c'}}} \quad \P\, da_0 \dagger d_1 \quad$ i.e. $\P\, d_1a_0$

3. $\overset{1}{ba_0} \dagger \overset{2}{cd'_0} \dagger \overset{3}{d_1b'_0}$; $\qquad \overset{1}{\underline{b}a} \dagger \overset{3}{\underline{\underline{db'}}} \dagger \overset{2}{c\underline{\underline{d'}}} \quad \P\, ac_0$

4. $\overset{1}{bc_0} \dagger \overset{2}{a_1b'_0} \dagger \overset{3}{c'd_0}$; $\qquad \overset{1}{\underline{bc}} \dagger \overset{2}{a\underline{\underline{b'}}} \dagger \overset{3}{\underline{\underline{c'}}d} \quad \P\, ad_0 \dagger a_1 \quad$ i.e. $\P\, a_1d_0$

5. $\overset{1}{b'_1a_0} \dagger \overset{2}{bc_0} \dagger \overset{3}{a'd_0}$; $\qquad \overset{1}{\underline{b'a}} \dagger \overset{2}{\underline{\underline{b}}c} \dagger \overset{3}{\underline{\underline{a'}}d} \quad \P\, cd_0$

6. $\overset{1}{a_1b_0} \dagger \overset{2}{b'c_0} \dagger \overset{3}{d_1a'_0}$; $\qquad \overset{1}{\underline{ab}} \dagger \overset{2}{\underline{\underline{b'}}c} \dagger \overset{3}{d\underline{\underline{a'}}} \quad \P\, cd_0 \dagger d_1 \quad$ i.e. $\P\, d_1c_0$

7. $\overset{1}{db'_0} \dagger \overset{2}{b_1a'_0} \dagger \overset{3}{cd'_0}$; $\qquad \overset{1}{\underline{db'}} \dagger \overset{2}{\underline{\underline{b}}a'} \dagger \overset{3}{c\underline{\underline{d'}}} \quad \P\, a'c_0$

8. $\overset{1}{b'd_0} \dagger \overset{2}{a'b_0} \dagger \overset{3}{c_1d'_0}$; $\qquad \overset{1}{\underline{b'd}} \dagger \overset{2}{a'\underline{\underline{b}}} \dagger \overset{3}{c\underline{\underline{d'}}} \quad \P\, a'c_0 \dagger c_1 \quad$ i.e. $\P\, c_1a'_0$

9. $\overset{1}{b'_1a'_0} \dagger \overset{2}{ad_0} \dagger \overset{3}{b_1c'_0}$; $\qquad \overset{1}{\underline{b'a'}} \dagger \overset{2}{\underline{\underline{a}}d} \dagger \overset{3}{\underline{\underline{b}}c'} \quad \P\, dc'_0$

10. $\overset{1}{cd_0} \dagger \overset{2}{b_1c'_0} \dagger \overset{3}{ad'_0}$; $\qquad \overset{1}{\underline{cd}} \dagger \overset{2}{b\underline{\underline{c'}}} \dagger \overset{3}{a\underline{\underline{d'}}} \quad \P\, ba_0 \dagger b_1 \quad$ i.e. $\P\, b_1a_0$

11. $\overset{1}{bc_0} \dagger \overset{2}{d_1a'_0} \dagger \overset{3}{c'_1a_0}$; $\quad \overset{1}{b\underline{c}} \dagger \overset{3}{\underline{\underline{c'}a}} \dagger \overset{2}{d\underline{\underline{a'}}} \quad \P\ bd_0 \dagger d_1$ i.e. $\P\ d_1b_0$

12. $\overset{1}{cb'_0} \dagger \overset{2}{c'_1d_0} \dagger \overset{3}{b_1a'_0}$; $\quad \overset{1}{\underline{cb'}} \dagger \overset{2}{\underline{\underline{c'}}d} \dagger \overset{3}{\underline{\underline{b}}a'} \quad \P\ da'_0$

13. $\overset{1}{d_1e'_0} \dagger \overset{2}{c_1a'_0} \dagger \overset{3}{bd'_0} \dagger \overset{4}{e_1a_0}$; $\quad \overset{1}{\underline{de'}} \dagger \overset{3}{b\underline{\underline{d'}}} \dagger \overset{4}{\underline{\underline{e}a}} \dagger \overset{2}{c\underline{\underline{a'}}} \quad \P\ bc_0 \dagger c_1$

i.e. $\P\ c_1b_0$

14. $\overset{1}{c_1b'_0} \dagger \overset{2}{a_1e'_0} \dagger \overset{3}{d_1b_0} \dagger \overset{4}{a'_1c'_0}$; $\quad \overset{1}{\underline{cb'}} \dagger \overset{3}{d\underline{\underline{b}}} \dagger \overset{4}{\underline{a'\underline{c'}}} \dagger \overset{2}{\underline{\underline{a}}e'} \quad \P\ de'_0 \dagger d_1$

i.e. $\P\ d_1e'_0$

15. $\overset{1}{b'd_0} \dagger \overset{2}{e_1c'_0} \dagger \overset{3}{b_1a'_0} \dagger \overset{4}{d'_1c_0}$; $\quad \overset{1}{\underline{b'd}} \dagger \overset{3}{\underline{\underline{b}}a'} \dagger \overset{4}{\underline{\underline{d'}c}} \dagger \overset{2}{e\underline{\underline{c'}}} \quad \P\ a'e_0 \dagger e_1$

i.e. $\P\ e_1a'_0$

16. $\overset{1}{a'e_0} \dagger \overset{2}{d_1c_0} \dagger \overset{3}{a_1b'_0} \dagger \overset{4}{e'_1d'_0}$; $\quad \overset{1}{\underline{a'e}} \dagger \overset{3}{\underline{\underline{a}}b'} \dagger \overset{4}{\underline{\underline{e'}d'}} \dagger \overset{2}{\underline{\underline{d}}c} \quad \P\ b'c_0$

17. $\overset{1}{d_1c'_0} \dagger \overset{2}{a_1e'_0} \dagger \overset{3}{bd'_0} \dagger \overset{4}{c_1e_0}$; $\quad \overset{1}{\underline{dc'}} \dagger \overset{3}{b\underline{\underline{d'}}} \dagger \overset{4}{\underline{\underline{c}e}} \dagger \overset{2}{a\underline{\underline{e'}}} \quad \P\ ba_0 \dagger a_1$

i.e. $\P\ a_1b_0$

18. $\overset{1}{a_1b'_0} \dagger \overset{2}{d_1e'_0} \dagger \overset{3}{a'_1c_0} \dagger \overset{4}{be_0}$; $\quad \overset{1}{\underline{ab'}} \dagger \overset{3}{\underline{\underline{a'}}c} \dagger \overset{4}{\underline{\underline{b}e}} \dagger \overset{2}{d\underline{\underline{e'}}} \quad \P\ cd_0 \dagger d_1$

i.e. ¶ $d_1 c_0$

19. $\overset{1}{bc_0} \dagger \overset{2}{e_1 h'_0} \dagger \overset{3}{a_1 b'_0} \dagger \overset{4}{dh_0} \dagger \overset{5}{e'_1 c'_0}$; $\overset{1}{\underline{bc}} \dagger \overset{3}{\underline{a\underline{\underline{b'}}}} \dagger \overset{5}{\underline{e'\underline{\underline{c'}}}} \dagger \overset{2}{\underline{\underline{\underline{e}}h'}} \dagger \overset{4}{\underline{d\underline{\underline{h}}}}$

¶ $ad_0 \dagger a_1$ i.e. ¶ $a_1 d_0$

20. $\overset{1}{dh'_0} \dagger \overset{2}{ce_0} \dagger \overset{3}{h_1 b'_0} \dagger \overset{4}{ad'_0} \dagger \overset{5}{be'_0}$;

$\overset{1}{\underline{dh'}} \dagger \overset{3}{\underline{\underline{\underline{h}}b'}} \dagger \overset{4}{\underline{a\underline{\underline{d'}}}} \dagger \overset{5}{\underline{\underline{\underline{b}}e'}} \dagger \overset{2}{c\underline{\underline{e}}}$ ¶ ac_0

21. $\overset{1}{b_1 a'_0} \dagger \overset{2}{dh_0} \dagger \overset{3}{ce_0} \dagger \overset{4}{ah'_0} \dagger \overset{5}{c'_1 b'_0}$;

$\overset{1}{\underline{ba'}} \dagger \overset{4}{\underline{\underline{\underline{a}}h'}} \dagger \overset{2}{d\underline{\underline{h}}} \dagger \overset{5}{\underline{c'\underline{\underline{b'}}}} \dagger \overset{3}{\underline{\underline{c}}e}$ ¶ de_0

22. $\overset{1}{e_1 d_0} \dagger \overset{2}{b'h'_0} \dagger \overset{3}{c'_1 d'_0} \dagger \overset{4}{a_1 e'_0} \dagger \overset{5}{ch_0}$;

$\overset{1}{\underline{ed}} \dagger \overset{3}{\underline{c'\underline{\underline{d'}}}} \dagger \overset{4}{\underline{a\underline{\underline{e'}}}} \dagger \overset{5}{\underline{\underline{\underline{c}}h}} \dagger \overset{2}{b'\underline{\underline{h'}}}$ ¶ $ab'_0 \dagger a_1$ i.e. ¶ $a_1 b_0$

23. $\overset{1}{b'_1 a_0} \dagger \overset{2}{de'_0} \dagger \overset{3}{h_1 b_0} \dagger \overset{4}{ce_0} \dagger \overset{5}{d'_1 a'_0}$;

$\overset{1}{\underline{b'a}} \dagger \overset{3}{h\underline{\underline{b}}} \dagger \overset{5}{\underline{d'\underline{a'}}} \dagger \overset{2}{\underline{\underline{d}e'}} \dagger \overset{4}{c\underline{\underline{e}}}$ ¶ $hc_0 \dagger h_1$ i.e. ¶ $h_1 c_0$

24. $\overset{1}{h'_1 k_0} \dagger \overset{2}{b'a_0} \dagger \overset{3}{c_1 d'_0} \dagger \overset{4}{e_1 h_0} \dagger \overset{5}{dk'_0} \dagger \overset{6}{bc'_0}$;

$\overset{1}{h'k} \dagger \overset{4}{eh} \dagger \overset{5}{dk'} \dagger \overset{3}{cd'} \dagger \overset{6}{bc'} \dagger \overset{2}{b'a} \quad \P\, ea_0 \dagger e_1 \quad$ i.e. $\P\, e_1a_0$

25. $\overset{1}{a_1d'_0} \dagger \overset{1}{k_1b'_0} \dagger \overset{1}{e_1h'_0} \dagger \overset{1}{a'b_0} \dagger \overset{5}{d_1c'_0} \dagger \overset{6}{h_1k'_0}$;

$\overset{1}{ad'} \dagger \overset{4}{a'b} \dagger \overset{2}{kb'} \dagger \overset{5}{dc'} \dagger \overset{6}{hk'} \dagger \overset{3}{eh'} \quad \P\, c'e_0 \dagger e_1 \quad$ i.e. $\P\, e_1c'_0$

26. $\overset{1}{a'_1h'_0} \dagger \overset{2}{d'k'_0} \dagger \overset{3}{e_1b_0} \dagger \overset{4}{hk_0} \dagger \overset{5}{a_1c'_0} \dagger \overset{6}{b'd_0}$;

$\overset{1}{a'h'} \dagger \overset{4}{hk} \dagger \overset{2}{d'k'} \dagger \overset{5}{ac'} \dagger \overset{6}{b'd} \dagger \overset{3}{eb} \quad \P\, c'e_0 \dagger e_1 \quad$ i.e. $\P\, e_1c'_0$

27. $\overset{1}{e_1d_0} \dagger \overset{2}{hb_0} \dagger \overset{3}{a'_1k'_0} \dagger \overset{4}{ce'_0} \dagger \overset{5}{b'_1d'_0} \dagger \overset{6}{ac'_0}$;

$\overset{1}{ed} \dagger \overset{4}{ce'} \dagger \overset{5}{b'd'} \dagger \overset{2}{hb} \dagger \overset{6}{ac'} \dagger \overset{3}{a'k'} \quad \P\, hk'_0$

28. $\overset{1}{a'k_0} \dagger \overset{2}{e_1b'_0} \dagger \overset{3}{hk'_0} \dagger \overset{4}{d'c_0} \dagger \overset{5}{ab_0} \dagger \overset{6}{c'_1h'_0}$;

$\overset{1}{a'k} \dagger \overset{3}{hk'} \dagger \overset{5}{ab} \dagger \overset{2}{eb'} \dagger \overset{6}{c'h'} \dagger \overset{4}{d'c} \quad \P\, ed'_0 \dagger e_1 \quad$ i.e. $\P\, e_1d'_0$

29. $\overset{1}{ek_0} \dagger \overset{2}{b'm_0} \dagger \overset{3}{ac'_0} \dagger \overset{4}{h'_1e'_0} \dagger \overset{5}{d_1k'_0} \dagger \overset{6}{cb_0} \dagger \overset{7}{d'_1l'_0} \dagger \overset{8}{hm'_0}$;

$\overset{1}{ek} \dagger \overset{4}{h'e'} \dagger \overset{5}{dk'} \dagger \overset{7}{d'l'} \dagger \overset{8}{hm'} \dagger \overset{2}{b'm} \dagger \overset{6}{cb} \dagger \overset{3}{ac'} \quad \P\, l'a_0$

$$\begin{array}{llllllllll} 1 & 2 & 3 & 5 & 5 & 6 & 7 & 8 & 9 & 10 \end{array}$$

30. $n_1 m'_0 + a'_1 e'_0 + c' l'_0 + k_1 r_0 + a k'_0 + d l'_0 + c n'_0 + e_1 b'_0 + m_1 r'_0 + h_1 d'_0$;

$$\begin{array}{llllllllll} 1 & 7 & 3 & 6 & 9 & 4 & 10 & 5 & 2 & 8 \end{array}$$

$$\underline{nm'} + \underline{cn'} + \underline{c'l'} + \underline{dl'} + \underline{mr'} + \underline{kr} + \underline{hd'} + \underline{ak'} + \underline{a'e'} + \underline{eb'}$$

¶ $kb'_0 + k_1$ i.e. ¶ $k_1 b'_0$

SL9

Solutions for § 9.

1.

1 2 3 1 3 2

[illegible]

i.e. Babies cannot manage crocodiles.

2.

1 2 3 1 3 2

[illegible]

i.e. Your presents to me are not made of tin.

3.

1 2 3 1 3 2

[illegible]

i.e. All my potatoes in this dish are old ones.

4.

1 2 3 1 2 3

i.e. My servants never say "shpoonj."

5.

1 2 3 1 2 3

$aa'_0 + ca'_0 + ba'_1 + a'_0$ $aa' + ca' + ba'$ $(a_0, b_1,$ i.e. $(b, c_0$

i.e. My poultry are not officers.

6.

1	2	3	1	2	3	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

i.e. None of your sons are fit to serve on a jury.

7.

1 2 3 1 3 2

[illegible]

i.e. No pencils of mine are sugarplums.

8.

1 2 3 1 3 2

i.e. Jenkins is inexperienced.

9.

1 2 3 1 2 3

cd, †dd, †cd; cd†dd†cd ∴ |ad,

i.e. No comet has a curly tail.

10.

1 2 3 1 3 2

i.e. No hedgehog takes in the Times.

11.

1 2 3 1 2 3

[illegible]

i.e. This dish is unwholesome.

12.

1 2 3 1 3 2

$b_1c_1 + a_1d_1 + a_1c_1$; $ac + ac + ad$ $(bd_1 + b_1$, i.e. $(b_1d_1$

i.e. My gardener is very old.

13.

1 2 3   1 3 2

$a\alpha_1 + b\beta_2 + c\gamma_3$; $a\alpha + c\gamma + b\beta$ $\Sigma a\alpha_1$, i.e. $\Sigma a\alpha_1$

i.e. *All humming-birds are small.*

14.

1 2 3 1 3 2

[illegible]

i.e. No one with a hooked nose ever fails to make money.

15.

1 2 3 1 2 3

i.e. No gray ducks in this village wear lace collars.

16.

1 2 3 1 2 3

[illegible]

i.e. *No jug in this cupboard will hold water.*

17.

1 2 3 1 2 3

[illegible]

i.e. These apples were grown in the sun.

18.

1 2 3 1 2 3

i.e. Puppies, that will not lie still, never care to do worsted-work.

19.

1 2 3 1 3 2

i.e. No name in this list is unmelodious.

20.

1 2 3 1 3 2

[illegible]

i.e. No M.P. should ride in a donkey-race, unless he has perfect self-command.

21.

1 2 3 1 3 2

$ba_q + ca_q + bc_q$; $ba + bc + ca$ (ca_q

i.e. No goods in this shop, that are still on sale, may be carried away.

22.

1 2 3 1 3 2

$ab_1 + ca_1 + da_1;$ $db + da + ca$ $(bc_1$

i.e. No acrobatic feat, which involves turning a quadruple somersault, is ever attempted in a circus.

23.

1 2 3 1 3 2

i.e. Guinea-pigs never really appreciate Beethoven.

24.

1 2 3 1 3 2

[illegible]

i.e. No scentless flowers please me.

25.

1 2 3 1 3 2

i.e. Showy talkers are not really well-informed.

26.

1 2 3 4   1 3 4 2

ea, ibd, idc, ied;   eaidcieibd (ca,

i.e. None but red-haired boys learn Greek in this school.

27.

$$\overset{1}{b_1 a_0} + \overset{2}{a c'_0} + \overset{3}{e_1 d'_0} + \overset{4}{c_1 b'_0};$$

$$\overset{1}{bd} + \overset{3}{ed'} + \overset{4}{cb'} + \overset{2}{ac'} = ea_0 + e_1, \quad \text{i.e.} = e_1 a_0$$

i.e. Wedding-cake always disagrees with me.

28.

$$\overset{1}{ad_0} + \overset{2}{e'_1 b'_0} + \overset{3}{c_1 d'_0} + \overset{4}{e_1 d_0};$$

$$\underline{\overset{1}{ad}} + \underline{\underline{\overset{3}{cd'}}} + \underline{\underline{\overset{4}{ed}}} + \underline{\underline{\overset{2}{e'b'}}} \ \P\ cb'_0 + c_1, \quad \text{i.e.} \ \P\ c_1 b'_0$$

i.e. Discussions, that go on while Tomkins is in the chair, endanger the peacefulness of our Debating-Club.

29.

$$\overset{1}{d_1a_0} + \overset{2}{e'c_0} + \overset{3}{b_1a'_0} + \overset{4}{d'e_0};$$

$$\underline{\overset{1}{da}} + \underline{\underline{\overset{3}{ba'}}} + \underline{\underline{\overset{4}{d'e}}} + \underline{\underline{\overset{2}{e'c}}} \quad \P\, bc_0 + b_1, \quad \text{i.e.}\ \P\, b_1c_0$$

i.e. All gluttons in my family are unhealthy.

30.

1 2 3 4

$a_1e_0 + c'a_0 + b_1e'_0 + c_1a''_0$;

1 3 4 2

$de + be' + ca'' + c'a$ ¶ $ba_0 + b_1$, i.e. ¶ b_1a_0

i.e. An egg of the Great Auk is not to be had for a song.

31.

1 2 3 4 1 4 2 3

[illegible]

i.e. No books sold here have gilt edges unless they are priced at 5s. and upwards.

32.

$$\overset{1}{d_1c'_0} + \overset{2}{d_1b_0} + \overset{3}{a_1e'_0} + \overset{4}{c_1b'_0};$$

$$\overset{1}{dc'} + \overset{3}{ae'} + \overset{4}{cb'} + \overset{2}{db} \quad ¶\, e'd_0 + d_1, \quad \text{i.e. } ¶\, d_1e'_0$$

i.e. When you cut your finger, you will find Tincture of Calendula useful.

33.

1 2 3 4 1 4 2 3

i.e. I have never come across a mermaid at sea.

34.

$$\overset{1}{c'_1 b_0} + \overset{2}{a_1 e'_0} + \overset{3}{d_1 b'_0} + \overset{4}{a'_1 c_0};$$

$$\overset{1}{\underline{c'b}} + \overset{3}{\underline{\underline{db'}}} + \overset{4}{\underline{\underline{a'c}}} + \overset{2}{\underline{\underline{ae'}}} \quad \P\, d e'_0 + d_1, \quad \text{i.e.} \ \P\, d_1 e'_0$$

i.e. All the romances in this library are well-written.

35.

1 2 3 4 1 3 4 2

i.e. *No bird in this aviary lives on mince-pies.*

36.

1 2 3 4 1 3 4 2

[illegible]

i.e. No plum-pudding, that has not been boiled in a cloth, can be distinguished from soup.

37.

$$\overset{1}{ce'_0} + \overset{2}{b'a'_0} + \overset{3}{h_1 d''_0} + \overset{4}{ae_0} + \overset{5}{bd_0};$$

$$\overset{1}{ce'} + \overset{4}{ae} + \overset{2}{b'a'} + \overset{5}{bd} + \overset{3}{hd'} \;\P\; ch_0 + h_1; \quad \text{i.e.}\ \P\, h_1 c_0$$

i.e. All your poems are uninteresting.

38.

$$\overset{1}{b'_1a'_0} + \overset{2}{db_0} + \overset{3}{he'_0} + \overset{4}{ec_0} + \overset{5}{a_1h'_0};$$

$$\overset{1}{\underline{b'a'}} + \overset{2}{\underline{\underline{db}}} + \overset{5}{\underline{\underline{ah'}}} + \overset{3}{\underline{\underline{he'}}} + \overset{4}{\underline{\underline{ec}}} \quad \P\, dc_0$$

i.e. None of my peaches have been grown in a hothouse.

39.

$$\begin{array}{ccccccccc} 1 & & 2 & & 3 & & 4 & & 5 \\ c_1 d_0 & + & h_1 e'_0 & + & c'_1 a'_0 & + & h'' b_0 & + & e_1 d''_0 ; \end{array}$$

$$\begin{array}{ccccccccc} 1 & & 3 & & 5 & & 2 & & 4 \\ cd & + & c'a' & + & ed'' & + & he' & + & h''b \end{array}$$

¶ $a'b_0$

i.e. No pawnbroker is dishonest.

40.

$$\overset{1}{bd'_0} + \overset{2}{c'h_0} + \overset{3}{e_1b'_0} + \overset{4}{da_0} + \overset{5}{e'c_0};$$

$$\overset{1}{\underline{bd'}} + \overset{3}{\underline{\underline{eb'}}} + \overset{4}{\underline{\underline{da}}} + \overset{5}{\underline{\underline{e'c}}} + \overset{2}{\underline{\underline{c'h}}} \quad \P\, ah_0$$

i.e. No kitten with green eyes will play with a gorilla.

41.

$$\overset{1}{c_1 a'_0} + \overset{2}{h'b_0} + \overset{3}{ae_0} + \overset{4}{d_1 c'_0} + \overset{5}{h_1 e'_0};$$

$$\underline{\overset{1}{ca'}} + \underline{\underline{\overset{3}{ae}}} + \underline{\underline{\overset{4}{dc'}}} + \underline{\underline{\overset{5}{he'}}} + \underline{\underline{\overset{2}{h'b}}} \quad \P\, ab_0 + d_1, \quad \text{i.e.}\ \P\, d_1 b_0$$

i.e. All my friends in this College dine at the lower table.

42.

$$\overset{1}{ca_0} + \overset{2}{h_1 d'_0} + \overset{3}{c'_1 e'_0} + \overset{4}{b'a'_0} + \overset{5}{d_1 e_0};$$

$$\overset{1}{\underline{ca}} + \overset{3}{\underline{c'e'}} + \overset{4}{\underline{b'a'}} + \overset{5}{\underline{de}} + \overset{2}{\underline{hd'}} \quad \P\, b'h_0 + h_1, \text{ i.e. } \P\, h_1 b'_0$$

i.e. My writing-desk is full of live scorpions.

43.

$$\begin{array}{ccccc} 1 & 2 & 3 & 4 & 5 \\ b'_1e_0 & +\, ah_0 & +\, dc_0 & +\, e'_1a'_0 & +\, bc'_0 \end{array}$$

$$\begin{array}{ccccc} 1 & 4 & 2 & 5 & 3 \\ \underline{b'e} & +\, \underline{\underline{e'a'}} & +\, \underline{\underline{ah}} & +\, \underline{\underline{bc'}} & +\, \underline{\underline{dc}} \end{array} \quad \P\, hd_0$$

i.e. No Mandarin ever reads Hogg’s poems.

44.

$$\overset{1}{e_1 b'_0} + \overset{2}{a'd_0} + \overset{3}{c_1 h'_0} + \overset{4}{e'a_0} + \overset{5}{d''h_0};$$

$$\overset{1}{\underset{-}{eb'}} + \overset{4}{\underset{=}{e'a}} + \overset{2}{\underset{=}{a'd'}} + \overset{5}{\underset{=}{d''h}} + \overset{3}{\underset{=}{ch'}} \quad ¶\, b'c_0 + c_1, \text{ i.e. } ¶\, c_1 b'_0$$

i.e. Shakespeare was clever.

45.

$$\begin{array}{ccccc} 1 & 2 & 3 & 4 & 5 \\ e_1 b'_0 + & a'd_0 + & c_1 h'_0 + & e'a_0 + & d'''h_0; \end{array}$$

$$\begin{array}{ccccc} 1 & 4 & 2 & 5 & 3 \\ eb' + & e'a + & a'd' + & d'''h + & ch' \end{array}$$

¶ $b'c_0 + c_1$; i.e. ¶ $c_1 b'_0$

i.e. Rainbows are not worth writing odes to.

46.

$$\begin{array}{ccccc} 1 & 2 & 3 & 4 & 5 \\ c'_1h'_0 & +\,e_1a_0 & +\,bd_0 & +\,a'_1h_0 & +\,d'c_0; \end{array}$$

$$\begin{array}{ccccc} 1 & 4 & 2 & 5 & 3 \\ ch' & +\,ah & +\,ea & +\,d'c & +\,bd \\ - & = & : & = & : \end{array} \quad ¶\, eb_0 + e_1, \quad \text{i.e. } ¶\, e_1b_0$$

i.e. These Sorites-examples are difficult.

47.

$$\overset{1}{a'_1 e'_0} \dagger \overset{2}{b k_0} \dagger \overset{3}{c' a_0} \dagger \overset{4}{e h'_0} \dagger \overset{5}{a_1 b'_0} \dagger \overset{6}{k' h_0};$$

$$\overset{1}{a'e'} \dagger \overset{3}{c'a} \dagger \overset{4}{eh'} \dagger \overset{6}{k'h} \dagger \overset{2}{bk} \dagger \overset{5}{ab'} \quad ¶\, c'a_0 \dagger a_1,$$

i.e. $¶\, a_1 c'_0$

i.e. All my dreams come true.

48.

$$\overset{1}{a'h_0} \dagger \overset{2}{c'k_0} \dagger \overset{3}{a_1 d'_0} \dagger \overset{4}{e_1 h'_0} \dagger \overset{5}{b_1 k'_0} \dagger \overset{6}{c_1 e'_0};$$

$$\overset{1}{\underline{a'h}} \dagger \overset{3}{ad'} \dagger \overset{4}{eh'} \dagger \overset{6}{ce'} \dagger \overset{2}{c'k} \dagger \overset{5}{bk'} \quad \P\, d'b_0 \dagger b_1;$$

i.e. $\P\, b_1 d'_0$

i.e. All the English pictures here are painted in oils.

49.

$$\overset{1}{k'_1 e_0} + \overset{2}{c_1 h_0} + \overset{3}{b_1 a'_0} + \overset{4}{k d_0} + \overset{5}{h' a_0} + \overset{6}{b'_1 e'_0};$$

$$\overset{1}{\underline{k'e}} + \overset{4}{\underline{\underline{kd}}} + \overset{6}{\underline{b'}\,\underline{\underline{e'}}} + \overset{3}{\underline{\underline{b}}\,\underline{a'}} + \overset{5}{\underline{h'}\,\underline{\underline{a}}} + \overset{2}{\underline{\underline{ch}}} \quad ¶\, dc_0 + c_1,$$

i.e. ¶ $c_1 d_0$

i.e. Donkeys are not easy to swallow.

50.

1 2 3 4 5 6

$ab'_0 \dagger h'd_0 \dagger e_1c_0 \dagger b_1d'_0 \dagger a'k_0 \dagger c'_1h_0$;

1 4 2 6 5 3

$\underline{ab'} \dagger \underline{\underline{b}}\,\underline{d'} \dagger \underline{h'}\,\underline{\underline{d}} \dagger \underline{\underline{a'}}k \dagger \underline{c'}\,\underline{\underline{h}} \dagger e\underline{\underline{c}}$ ¶ $ke_0 \dagger e_1$;

i.e. ¶ e_1k_0

i.e. Opium-eaters never wear white kid gloves.

51.

$$\overset{1}{bc_0} \dagger \overset{2}{k_1 a'_0} \dagger \overset{3}{eh_0} \dagger \overset{4}{d_1 b'_0} \dagger \overset{5}{h'c'_0} \dagger \overset{6}{k'_1 e'_0};$$

$$\overset{1}{\underline{bc}} \dagger \overset{4}{\underline{\underline{d}}b'} \dagger \overset{5}{\underline{h'}\underline{\underline{c'}}} \dagger \overset{3}{\underline{e}\underline{\underline{h}}} \dagger \overset{6}{\underline{k'}\underline{\underline{e'}}} \dagger \overset{2}{\underline{\underline{k}}a'} \quad \P\, da'_0 \dagger d_1,$$

i.e. $\P\, d_1 a'_0$

i.e. A good husband always comes home for his tea.

52.

$$\overset{1}{a'_1 k'_0} \dagger \overset{2}{c h_0} \dagger \overset{3}{h' k_0} \dagger \overset{4}{b_1 d'_0} \dagger \overset{5}{e a_0} \dagger \overset{6}{d_1 c'_0}$$

$$\overset{1}{\underline{a'k'}} \dagger \overset{3}{\underline{\underline{h'k}}} \dagger \overset{2}{\underline{\underline{ch}}} \dagger \overset{6}{\underline{\underline{dc'}}} \dagger \overset{4}{\underline{\underline{bd'}}} \dagger \overset{5}{\underline{\underline{ea}}} \qquad \P\, b e_0 \dagger b_1,$$

i.e. $\P\, b_1 e_0$

i.e. Bathing-machines are never made of mother-of-pearl.

53.

$$\overset{1}{da'_0} + \overset{2}{k_1 b'_0} + \overset{3}{c_1 h_0} + \overset{4}{d'_1 k'_0} + \overset{5}{e_1 c'_0} + \overset{6}{a_1 h'_0};$$

$$\overset{1}{\underline{da'}} + \overset{4}{\underline{\underline{d'}}\underline{k'}} + \overset{2}{\underline{\underline{k}}b'} + \overset{6}{\underline{\underline{a}}\underline{h'}} + \overset{5}{\underline{c}\underline{\underline{h}}} + \overset{3}{e\underline{\underline{c'}}}$$

¶ $b'e_0 + e_1$; i.e. ¶ $e_1 b'_0$

i.e. Rainy days are always cloudy.

54.

$$\overset{1}{kb'_0} + \overset{1}{a'_1c'_0} + \overset{3}{d''b_0} + \overset{4}{k'_1h'_0} + \overset{5}{ea_0} + \overset{6}{d_1c_0};$$

$$\overset{1}{\underline{kb'}} + \overset{3}{\underline{d''}\underline{\underline{b}}} + \overset{4}{\underline{\underline{k'}}h'} + \overset{6}{\underline{\underline{d}}\underline{c}} + \overset{2}{\underline{a'}\underline{\underline{c'}}} + \overset{5}{e\underline{\underline{a}}}$$

¶ $h'e_0$

i.e. No heavy fish is unkind to children.

55.

$$\begin{array}{cccccc} 1 & 2 & 3 & 4 & 5 & 6 \end{array}$$

$$k'_1 b'_0 + eh'_0 + c'd_0 + hb_0 + ac_0 + kd'_0 :$$

$$\begin{array}{cccccc} 1 & 4 & 2 & 6 & 3 & 5 \end{array}$$

$$\underline{k'b'} + \underline{hb} + \underline{eh'} + \underline{kd'} + \underline{c'd} + \underline{ac}$$ ¶ ea_0

i.e. No engine-driver lives on barley-sugar.

56.

$$\overset{1}{h_1 b'_0} + \overset{2}{c_1 d'_0} + \overset{3}{k' a_0} + \overset{4}{e_1 h'_0} + \overset{5}{b_1 a'_0} + \overset{6}{k_1 c'_0};$$

$$\overset{1}{hb'} + \overset{4}{eh'} + \overset{5}{ba'} + \overset{3}{k'a} + \overset{6}{kc'} + \overset{2}{cd'}$$

¶ $ed'_0 + e_1$, i.e. ¶ $e_1 d'_0$

i.e. All the animals in the yard gnaw bones.

57.

1 2 3 4 5 6 7

$$h'_1 d'_0 + e_1 c'_0 + k' a_0 + c b_0 + d_1 l'_0 + e' h_0 + k l_0;$$

1 5 7 3 6 2 4

$$h'd' + dl' + kl + k'a + e'h + ec' + cb$$ ¶ ab_0

i.e. No badger can guess a conundrum.

58.

1 2 3 4 5 6 7 8

$$b'h_0 + d'_1 l'_0 + ca_0 + d_1 k'_0 + h'_1 e'_0 + mc'_0 + a'b_0 + ek_0;$$

1 5 7 3 6 8 4 2

$$b'h + h'e' + a'b + ca + mc' + ek + dk' + d'l'$$

¶ ml'_0

i.e. No cheque of yours, received by me, is payable to order.

59.

1 2 3 4 5 6 7 8 9

$$c_1 l'_0 + h'e_0 + kd_0 + mc'_0 + b'_1 e'_0 + n_1 a'_0 + l_1 d'_0 + m'b_0 + ah_0;$$

1 4 7 3 8 5 2 9 6

$$cl' + mc' + ld' + kd + m'b + b'e' + h'e + ah + na'$$

¶ kn_0

i.e. I cannot read any of Brown’s letters.

60.

$$\overset{1}{e_1c'_0} + \overset{2}{l_1n'_0} + \overset{3}{a_1a'_0} + \overset{4}{m''b_0} + \overset{5}{ck''_0} + \overset{6}{e'r_0} + \overset{7}{h_1n_0} + \overset{8}{b''k_0} + \overset{9}{r'_1d''_0} + \overset{10}{m_1l''_0};$$

$$\overset{1}{ec'} + \overset{5}{ck''} + \overset{6}{e'r} + \overset{8}{b''k} + \overset{4}{m''b} + \overset{9}{r'd''} + \overset{3}{da'} + \overset{10}{ml''} + \overset{2}{ln'} + \overset{7}{hn}$$

$$\P\, a'h_0 + h_1, \quad \text{i.e. } \P\, h_1a'_0$$

i.e. I always avoid a kangaroo.

NOTES.

Table of Contents

(A) [See p. 80].

One of the favourite objections, brought against the Science of Logic by its detractors, is that a Syllogism has no real validity as an argument, since it involves the Fallacy of Petitio Principii (i.e. “Begging the Question”, the essence of which is that the whole Conclusion is involved in one of the Premisses).

This formidable objection is refuted, with beautiful clearness and simplicity, by these three Diagrams, which show us that, in each of the three Figures, the Conclusion is really involved in the two Premisses taken together, each contributing its share.

Thus, in Fig. I., the Premiss xm0 empties the Inner Cell of the N.W. Quarter, while the Premiss ym0 empties its Outer Cell. Hence it needs the two Premisses to empty the whole of the N.W. Quarter, and thus to prove the Conclusion xy0.

Again, in Fig. II., the Premiss xm0 empties the Inner Cell of the N.W. Quarter. The Premiss ym1 merely tells us that the Inner Portion of the W. Half is occupied, so that we may place a ‘I’ in it, somewhere; but, if this were the whole of our information, we should not know in which Cell to place it, so that it would have to ‘sit on the fence’: it is only when we learn, from the other Premiss, that the upper of these two Cells is empty, that we feel authorised to place the ‘I’ in the lower Cell, and thus to prove the Conclusion x′y1.

Lastly, in Fig. III., the information, that m exists, merely authorises us to place a ‘I’ somewhere in the Inner Square——but it has large choice of fences to sit upon! It needs the Premiss xm0 to drive it out of the N. Half of that Square; and it needs the Premiss ym0 to drive it out of the W. Half. Hence it needs the two Premisses to drive it into the Inner Portion of the S.E. Quarter, and thus to prove

the Conclusion $x'y'1$.

APPENDIX,

ADDRESSED TO TEACHERS.

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§ 1.

Introductory.

There are several matters, too hard to discuss with Learners, which nevertheless need to be explained to any Teachers, into whose hands this book may fall, in order that they may thoroughly understand what my Symbolic Method is, and in what respects it differs from the many other Methods already published.

These matters are as follows:—

The “Existential Import” of Propositions.

The use of “is-not” (or “are-not”) as a Copula.

The theory “two Negative Premisses prove nothing.”

Euler’s Method of Diagrams.

Venn’s Method of Diagrams.

My Method of Diagrams.

The Solution of a Syllogism by various Methods.

My Method of treating Syllogisms and Sorites.

Some account of Parts II, III.

§ 2.

The "Existential Import" of Propositions.

The writers, and editors, of the Logical text-books which run in the ordinary grooves——to whom I shall hereafter refer by the (I hope inoffensive) title "The Logicians"——take, on this subject, what seems to me to be a more humble position than is at all necessary. They speak of the Copula of a Proposition "with bated breath", almost as if it were a living, conscious Entity, capable of declaring for itself what it chose to mean, and that we, poor human creatures, had nothing to do but to ascertain what was its sovereign will and pleasure, and submit to it.

In opposition to this view, I maintain that any writer of a book is fully authorised in attaching any meaning he likes to any word or phrase he intends to use. If I find an author saying, at the beginning of his book, "Let it be understood that by the word 'black' I shall always mean 'white', and that by the word 'white' I shall always mean 'black'," I meekly accept his ruling, however injudicious I may think it.

And so, with regard to the question whether a Proposition is or is not to be understood as asserting the existence of its Subject, I maintain that every writer may adopt his own rule, provided of course that it is consistent with itself and with the accepted facts of Logic.

Let us consider certain views that may logically be held, and thus settle which of them may conveniently be held; after which I shall hold myself free to declare

which of them I intend to hold.

The kinds of Propositions, to be considered, are those that begin with “some”, with “no”, and with “all”. These are usually called Propositions “in I”, “in E”, and “in A”.

First, then, a Proposition in I may be understood as asserting, or else as not asserting, the existence of its Subject. (By “existence” I mean of course whatever kind of existence suits its nature. The two Propositions, “dreams exist” and “drums exist”, denote two totally different kinds of “existence”. A dream is an aggregate of ideas, and exists only in the mind of a dreamer: whereas a drum is an aggregate of wood and parchment, and exists in the hands of a drummer.) First, let us suppose that I “asserts” (i.e. “asserts the existence of its Subject”).

Here, of course, we must regard a Proposition in A as making the same assertion, since it necessarily contains a Proposition in I.

We now have I and A “asserting”. Does this leave us free to make what supposition we choose as to E? My answer is “No. We are tied down to the supposition that E does not assert.” This can be proved as follows:— If possible, let E “assert”. Then (taking x, y, and z to represent Attributes) we see that, if the Proposition “No xy are z” be true, some things exist with the Attributes x and y: i.e. “Some x are y.”

Also we know that, if the Proposition “Some xy are z” be true, the same result follows.

But these two Propositions are Contradictories, so that one or other of them must be true. Hence this result is always true: i.e. the Proposition “Some x are y” is always true!

Quod est absurdum. (See Note (A), p. 195).

We see, then, that the supposition “I asserts” necessarily leads to “A asserts, but E does not”. And this is the first of the various views that may conceivably be held.

Next, let us suppose that I does not “assert.” And, along with this, let us take the supposition that E does “assert.”

Hence the Proposition “No x are y” means “Some x exist, and none of them are y”: i.e. “all of them are not-y,” which is a Proposition in A. We also know, of course, that the Proposition “All x are not-y” proves “No x are y.” Now two Propositions, each of which proves the other, are equivalent. Hence every Proposition in A is equivalent to one in E, and therefore “asserts”.

Hence our second conceivable view is “E and A assert, but I does not.”

This view does not seen to involve any necessary contradiction with itself or with the accepted facts of Logic. But, when we come to test it, as applied to the actual facts of life, we shall find I think, that it fits in with them so badly that its adoption would be, to say the least of it, singularly inconvenient for ordinary folk.

Let me record a little dialogue I have just held with my friend Jones, who is trying to form a new Club, to be regulated on strictly Logical principles.

Author. “Well, Jones! Have you got your new Club started yet?”

Jones (rubbing his hands). “You’ll be glad to hear that some of the Members (mind, I only say ‘some’) are millionaires! Rolling in gold, my boy!”

Author. “That sounds well. And how many Members have entered?”

Jones (staring). “None at all. We haven’t got it started yet. What makes you think we have?”

Author. “Why, I thought you said that some of the Members——”

Jones (contemptuously). “You don’t seem to be aware that we’re working on strictly Logical principles. A Particular Proposition does not assert the existence of its Subject. I merely meant to say that we’ve made a Rule not to admit any Members till we have at least three Candidates whose incomes are over ten thousand a year!”

Author. “Oh, that’s what you meant, is it? Let’s hear some more of your Rules.”

Jones. “Another is, that no one, who has been convicted seven times of forgery, is admissible.”

Author. “*And here, again, I suppose you don’t mean to assert there are any such convicts in existence?*”

Jones. “*Why, that’s exactly what I do mean to assert! Don’t you know that a Universal Negative asserts the existence of its Subject? Of course we didn’t make that Rule till we had satisfied ourselves that there are several such convicts now living.*”

The Reader can now decide for himself how far this second conceivable view would fit in with the facts of life. He will, I think, agree with me that Jones’ view, of the ‘Existential Import’ of Propositions, would lead to some inconvenience.

Thirdly, let us suppose that neither I nor E “asserts”.

Now the supposition that the two Propositions, “Some x are y” and “No x are not-y”, do not “assert”, necessarily involves the supposition that “All x are y” does not “assert”, since it would be absurd to suppose that they assert, when combined, more than they do when taken separately.

Hence the third (and last) of the conceivable views is that neither I, nor E, nor A, “asserts”.

The advocates of this third view would interpret the Proposition “Some x are y” to mean “If there were any x in existence, some of them would be y”; and so with E and A.

It admits of proof that this view, as regards A, conflicts with the accepted facts of Logic.

Let us take the Syllogism Darapti, which is universally accepted as valid. Its form is

“All m are x;

All m are y.

∴ Some y are x”.

This they would interpret as follows:— ”If there were any m in existence, all of them would be x;

If there were any m in existence, all of them would be y.

∴ If there were any y in existence, some of them would be x”.

That this Conclusion does not follow has been so briefly and clearly explained by Mr. Keynes (in his “Formal Logic”, dated 1894, pp. 356, 357), that I prefer to quote his words:—

“Let no proposition imply the existence either of its subject or of its predicate.

“Take, as an example, a syllogism in Darapti:—

‘All M is P,

All M is S,

∴ *Some S is P.’*

“Taking S, M, P, as the minor, middle, and major terms respectively, the conclusion will imply that, if there is an S, there is some P. Will the premisses also imply this? If so, then the syllogism is valid; but not otherwise.

“The conclusion implies that if S exists P exists; but, consistently with the premisses, S may be existent while M and P are both non-existent. An implication is, therefore, contained in the conclusion, which is not justified by the premisses.”

This seems to me entirely clear and convincing. Still, “to make sicker”, I may as

well throw the above (soi-disant) Syllogism into a concrete form, which will be within the grasp of even a non-logical Reader.

Let us suppose that a Boys' School has been set up, with the following system of Rules:— "All boys in the First (the highest) Class are to do French, Greek, and Latin. All in the Second Class are to do Greek only. All in the Third Class are to do Latin only."

Suppose also that there are boys in the Third Class, and in the Second; but that no boy has yet risen into the First.

It is evident that there are no boys in the School doing French: still we know, by the Rules, what would happen if there were any.

We are authorised, then, by the Data, to assert the following two Propositions:—

"If there were any boys doing French, all of them would be doing Greek;

If there were any boys doing French, all of them would be doing Latin."

And the Conclusion, according to "The Logicians" would be

"If there were any boys doing Latin, some of them would be doing Greek."

Here, then, we have two true Premisses and a false Conclusion (since we know that there are boys doing Latin, and that none of them are doing Greek). Hence the argument is invalid.

Similarly it may be shown that this "non-existential" interpretation destroys the validity of Disamis, Datisi, Felapton, and Fresison.

Some of "The Logicians" will, no doubt, be ready to reply "But we are not Aldrichians! Why should we be responsible for the validity of the Syllogisms of

so antiquated an author as Aldrich?”

Very good. Then, for the special benefit of these “friends” of mine (with what ominous emphasis that name is sometimes used! “I must have a private interview with you, my young friend,” says the bland Dr. Birch, “in my library, at 9 a.m. tomorrow. And you will please to be punctual!”), for their special benefit, I say, I will produce another charge against this “non-existential” interpretation.

It actually invalidates the ordinary Process of “Conversion”, as applied to Proposition in ‘I’.

Every logician, Aldrichian or otherwise, accepts it as an established fact that “Some x are y” may be legitimately converted into “Some y are x.”

But is it equally clear that the Proposition “If there were any x, some of them would be y” may be legitimately converted into “If there were any y, some of them would be x”? I trow not.

The example I have already used——of a Boys’ School with a non-existent First Class——will serve admirably to illustrate this new flaw in the theory of “The Logicians.”

Let us suppose that there is yet another Rule in this School, viz. “In each Class, at the end of the Term, the head boy and the second boy shall receive prizes.”

This Rule entirely authorises us to assert (in the sense in which “The Logicians” would use the words) “Some boys in the First Class will receive prizes”, for this simply means (according to them) “If there were any boys in the First Class, some of them would receive prizes.”

Now the Converse of this Proposition is, of course, “Some boys, who will receive prizes, are in the First Class”, which means (according to “The Logicians”) “If there were any boys about to receive prizes, some of them would be in the First Class” (which Class we know to be empty).

Of this Pair of Converse Propositions, the first is undoubtedly true: the second, as undoubtedly, false.

It is always sad to see a batsman knock down his own wicket: one pities him, as

a man and a brother, but, as a cricketer, one can but pronounce him “Out!”

We see, then, that, among all the conceivable views we have here considered, there are only two which can logically be held, viz.

I and A “assert”, but E does not.

E and A “assert”, but I does not.

The second of these I have shown to involve great practical inconvenience.

The first is the one adopted in this book. (See p. 19.) Some further remarks on this subject will be found in Note (B), at p. 196.

§ 3.

The use of “is-not” (or “are-not”) as a Copula.

Is it better to say “John is-not in-the-house” or “John is not-in-the-house”? “Some of my acquaintances are-not men-I-should-like-to-be-seen-with” or “Some of my acquaintances are men-I-should-not-like-to-be-seen-with”? That is the sort of question we have now to discuss.

This is no question of Logical Right and Wrong: it is merely a matter of taste, since the two forms mean exactly the same thing. And here, again, “The Logicians” seem to me to take much too humble a position. When they are putting the final touches to the grouping of their Proposition, just before the curtain goes up, and when the Copula——always a rather fussy ‘heavy father’, asks them “Am I to have the ‘not’, or will you tack it on to the Predicate?” they are much too ready to answer, like the subtle cab-driver, “Leave it to you, Sir!”

The result seems to be, that the grasping Copula constantly gets a “not” that had better have been merged in the Predicate, and that Propositions are differentiated which had better have been recognised as precisely similar. Surely it is simpler to treat “Some men are Jews” and “Some men are Gentiles” as being both of them, affirmative Propositions, instead of translating the latter into “Some men are-not Jews”, and regarding it as a negative Propositions?

The fact is, “The Logicians” have somehow acquired a perfectly morbid dread of negative Attributes, which makes them shut their eyes, like frightened children, when they come across such terrible Propositions as “All not-x are y”; and thus they exclude from their system many very useful forms of Syllogisms.

Under the influence of this unreasoning terror, they plead that, in Dichotomy by Contradiction, the negative part is too large to deal with, so that it is better to regard each Thing as either included in, or excluded from, the positive part. I see no force in this plea: and the facts often go the other way. As a personal question, dear Reader, if you were to group your acquaintances into the two Classes, men that you would like to be seen with, and men that you would not like to be seen with, do you think the latter group would be so very much the larger of the two?

For the purposes of Symbolic Logic, it is so much the most convenient plan to regard the two subdivisions, produced by Dichotomy, on the same footing, and to say, of any Thing, either that it “is” in the one, or that it “is” in the other, that I do not think any Reader of this book is likely to demur to my adopting that course.

§ 4.

The theory that “two Negative Premisses prove nothing”.

This I consider to be another craze of “The Logicians”, fully as morbid as their dread of a negative Attribute.

It is, perhaps, best refuted by the method of Instantia Contraria.

Take the following Pairs of Premisses:—

“None of my boys are conceited;

None of my girls are greedy”.

“None of my boys are clever;

None but a clever boy could solve this problem”.

“None of my boys are learned;

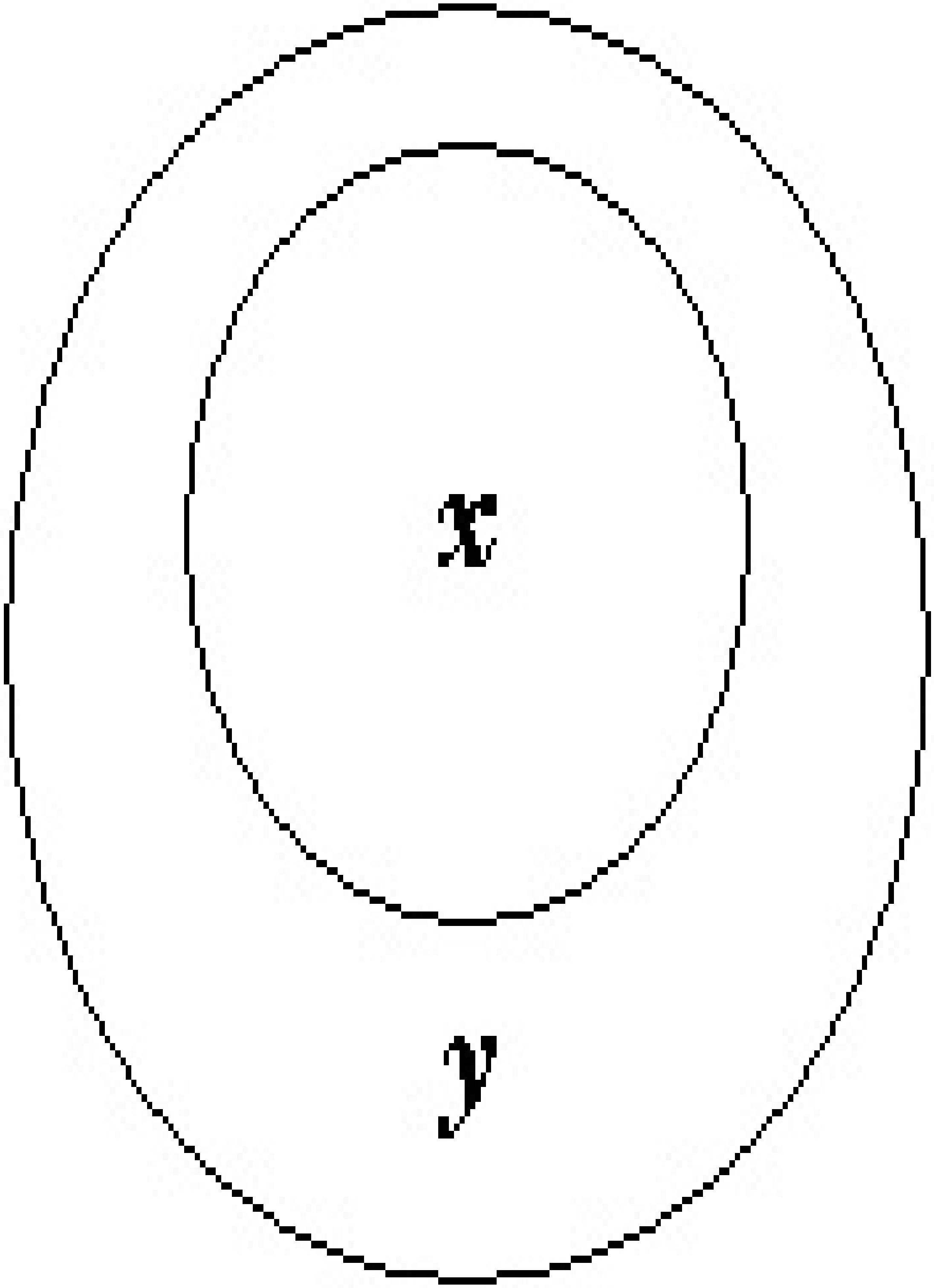
Some of my boys are not choristers”.

(This last Proposition is, in my system, an affirmative one, since I should read it “are not-choristers”; but, in dealing with “The Logicians,” I may fairly treat it as a negative one, since they would read it “are-not choristers”.) If you, dear Reader, declare, after full consideration of these Pairs of Premisses, that you cannot deduce a Conclusion from any of them——why, all I can say is that, like the Duke in Patience, you “will have to be contented with our heart-felt sympathy”! [See Note (C), p. 196.]

§ 5.

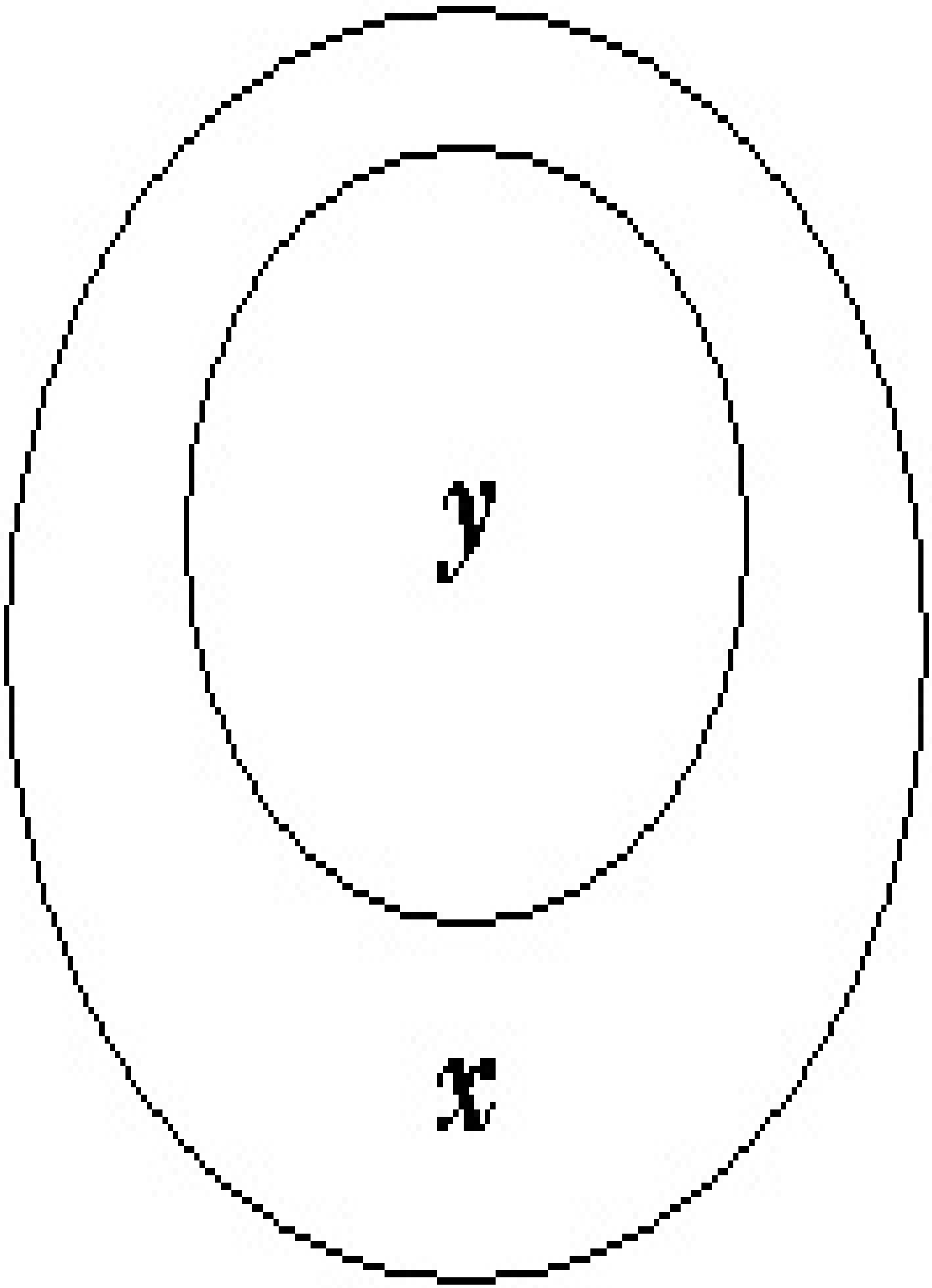
Euler’s Method of Diagrams.

Diagrams seem to have been used, at first, to represent Propositions only. In Euler’s well-known Circles, each was supposed to contain a class, and the Diagram consisted of two circles, which exhibited the relations, as to inclusion and exclusion, existing between the two Classes.



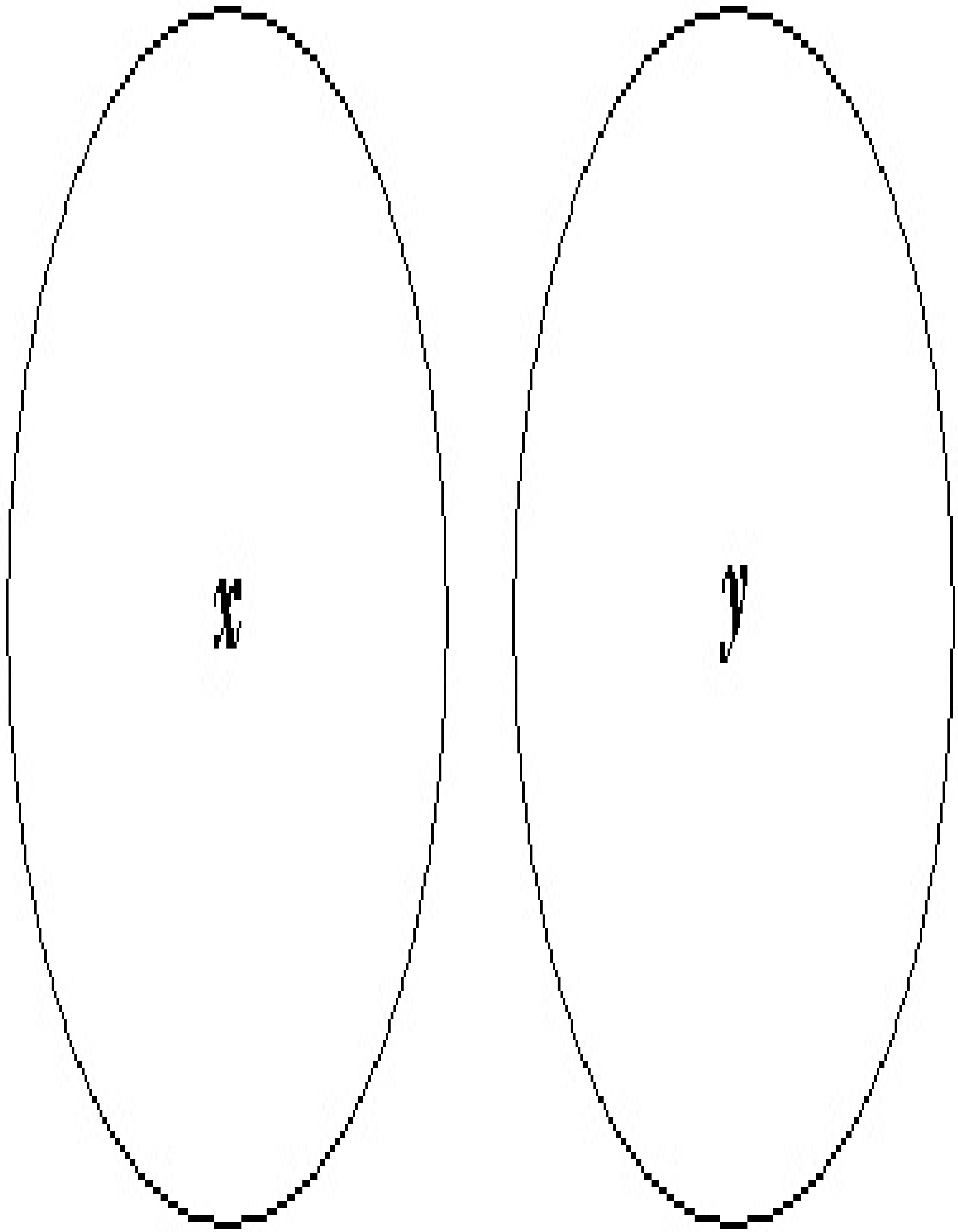
x
y

Thus, the Diagram, here given, exhibits the two Classes, whose respective Attributes are x and y, as so related to each other that the following Propositions are all simultaneously true:—“All x are y”, “No x are not-y”, “Some x are y”, “Some y are not-x”, “Some not-y are not-x”, and, of course, the Converses of the last four.

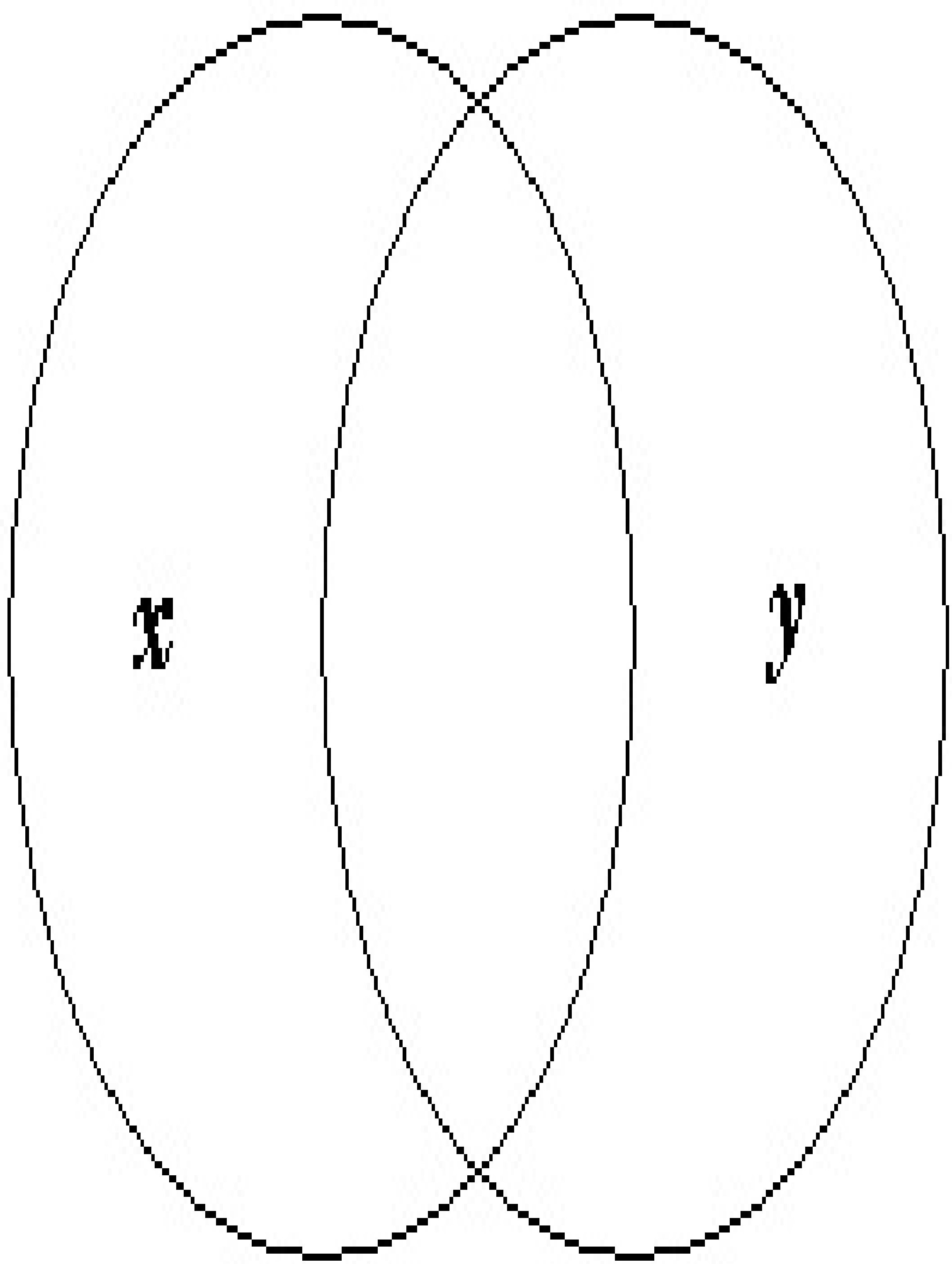


y
x

Similarly, with this Diagram, the following Propositions are true:—“All y are x”, “No y are not-x”, “Some y are x”, “Some x are not-y”, “Some not-x are not-y”, and, of course, the Converses of the last four.


x
y

Similarly, with this Diagram, the following are true:—“All x are not-y”, “All y are not-x”, “No x are y”, “Some x are not-y”, “Some y are not-x”, “Some not-x are not-y”, and the Converses of the last four.


x
y

Similarly, with this Diagram, the following are true:—“Some x are y”, “Some x are not-y”, “Some not-x are y”, “Some not-x are not-y”, and of course, their four Converses.

Note that all Euler’s Diagrams assert “Some not-x are not-y.” Apparently it never occured to him that it might sometimes fail to be true!

Now, to represent “All x are y”, the first of these Diagrams would suffice. Similarly, to represent “No x are y”, the third would suffice. But to represent any Particular Proposition, at least three Diagrams would be needed (in order to include all the possible cases), and, for “Some not-x are not-y”, all the four.

§ 6.

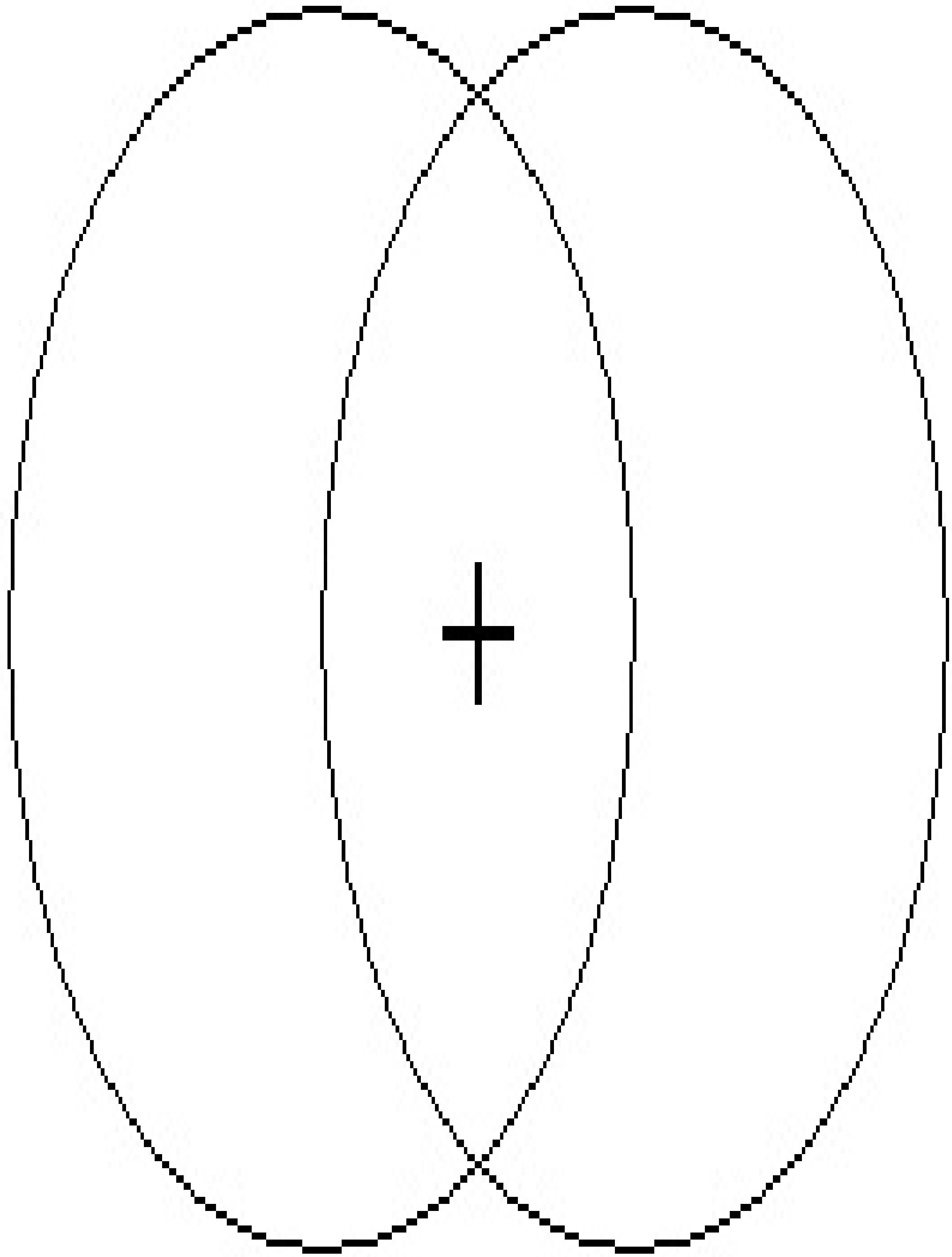
Venn’s Method of Diagrams.

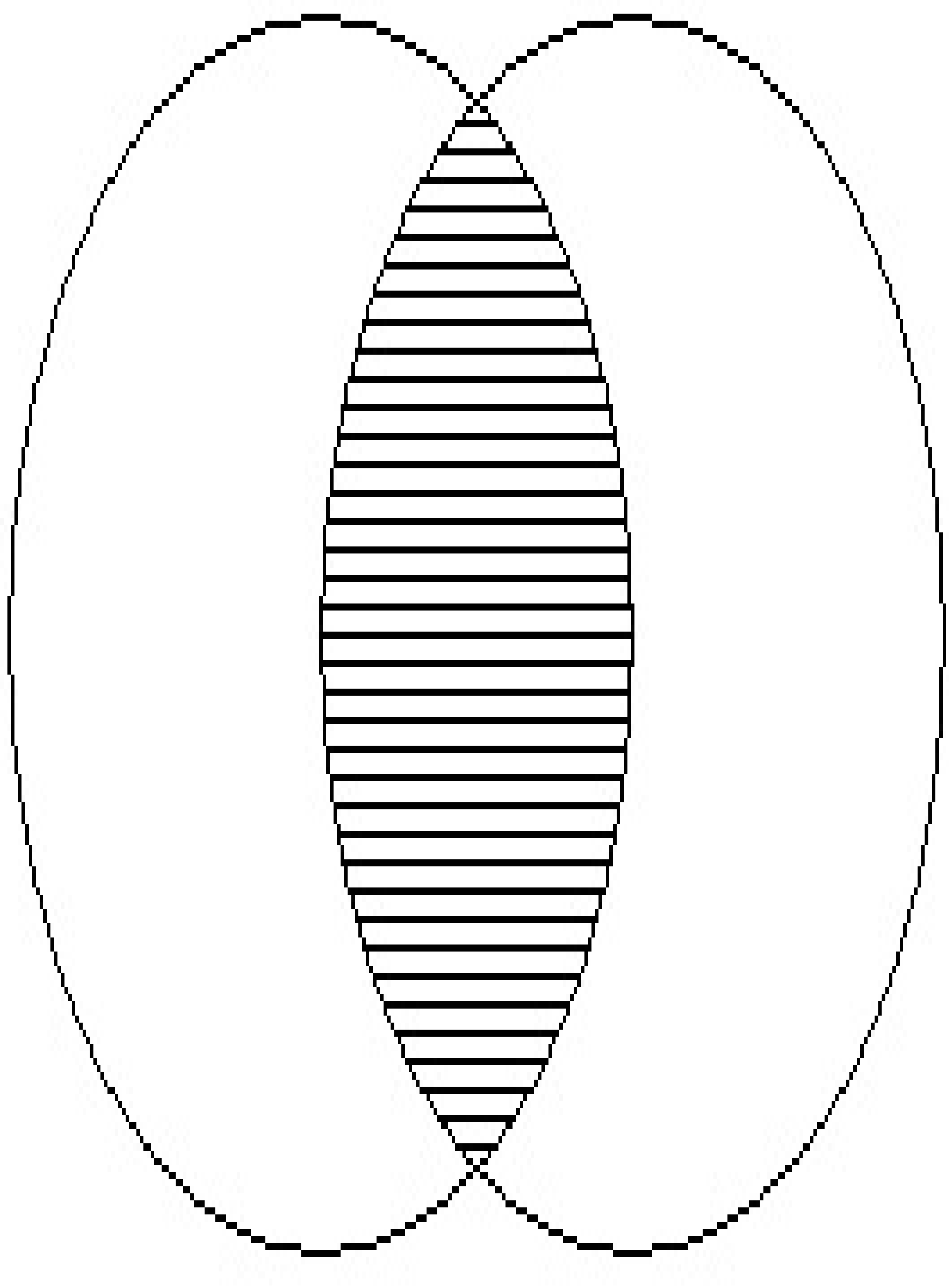
Let us represent “not-x” by “x′”.

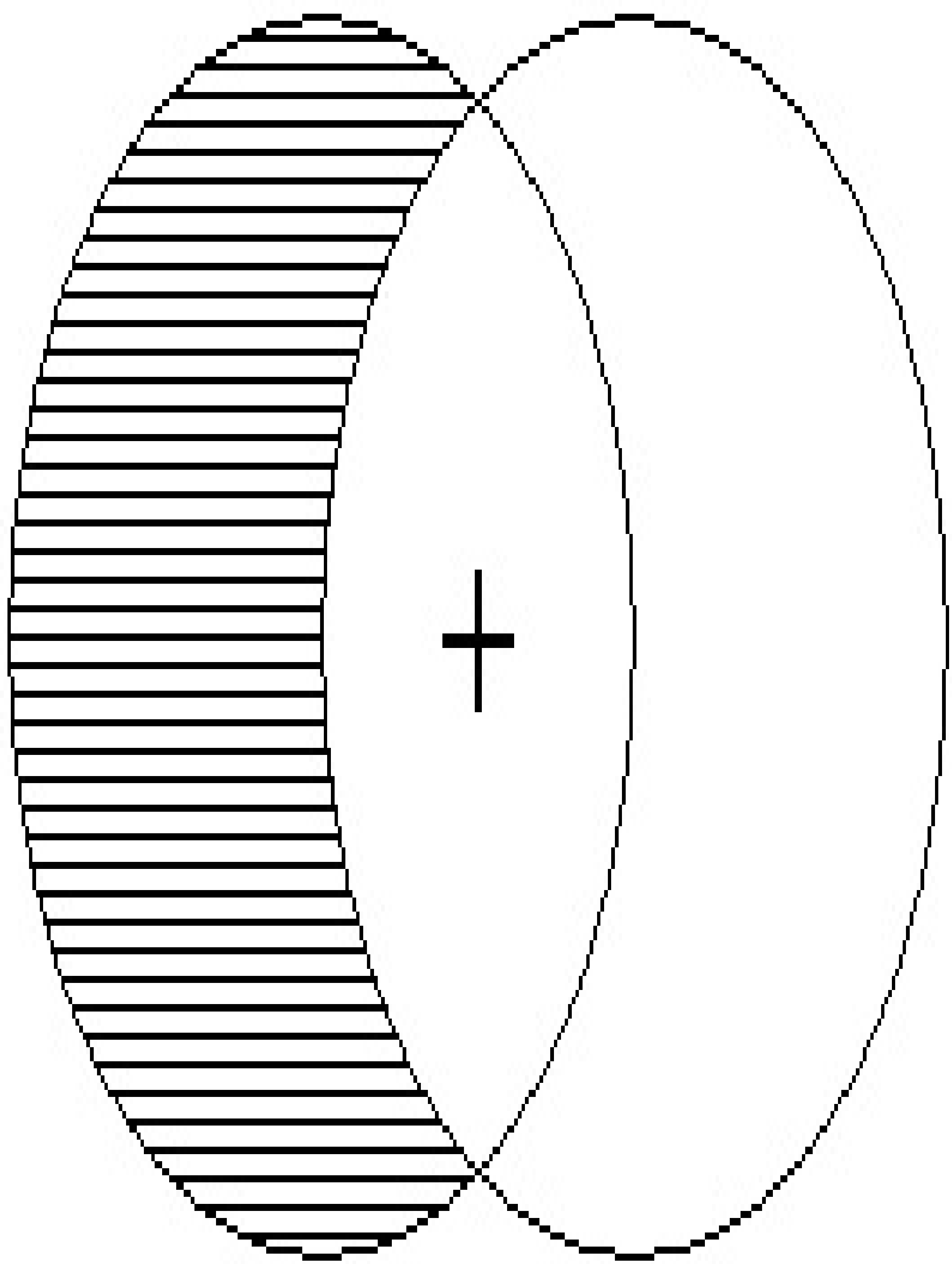
Mr. Venn’s Method of Diagrams is a great advance on the above Method.

He uses the last of the above Diagrams to represent any desired relation between x and y, by simply shading a Compartment known to be empty, and placing a + in one known to be occupied.

Thus, he would represent the three Propositions “Some x are y”, “No x are y”, and “All x are y”, as follows:—



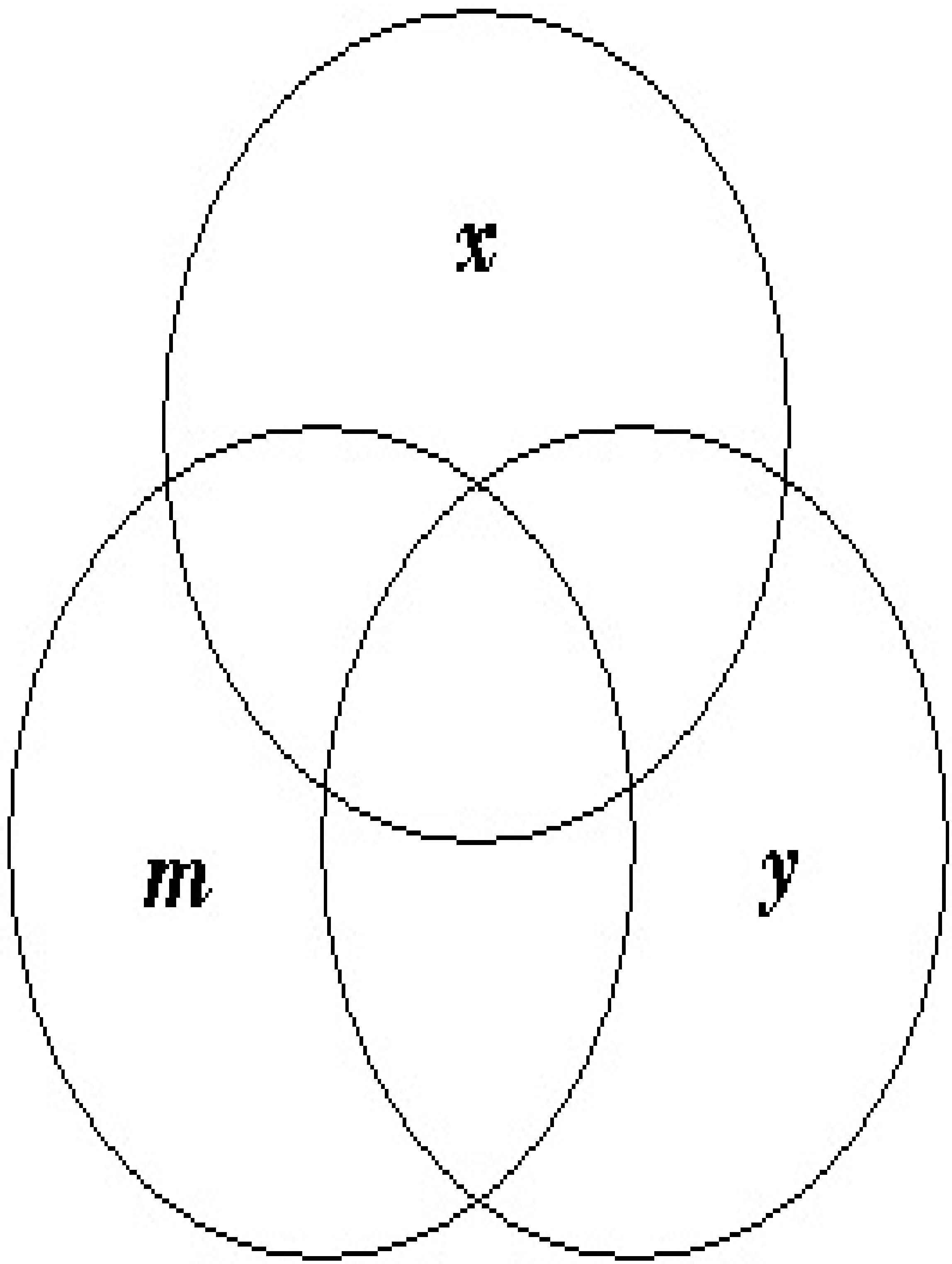




It will be seen that, of the four Classes, whose peculiar Sets of Attributes are xy, xy′, x′y, and x′y′, only three are here provided with closed Compartments, while the fourth is allowed the rest of the Infinite Plane to range about in!

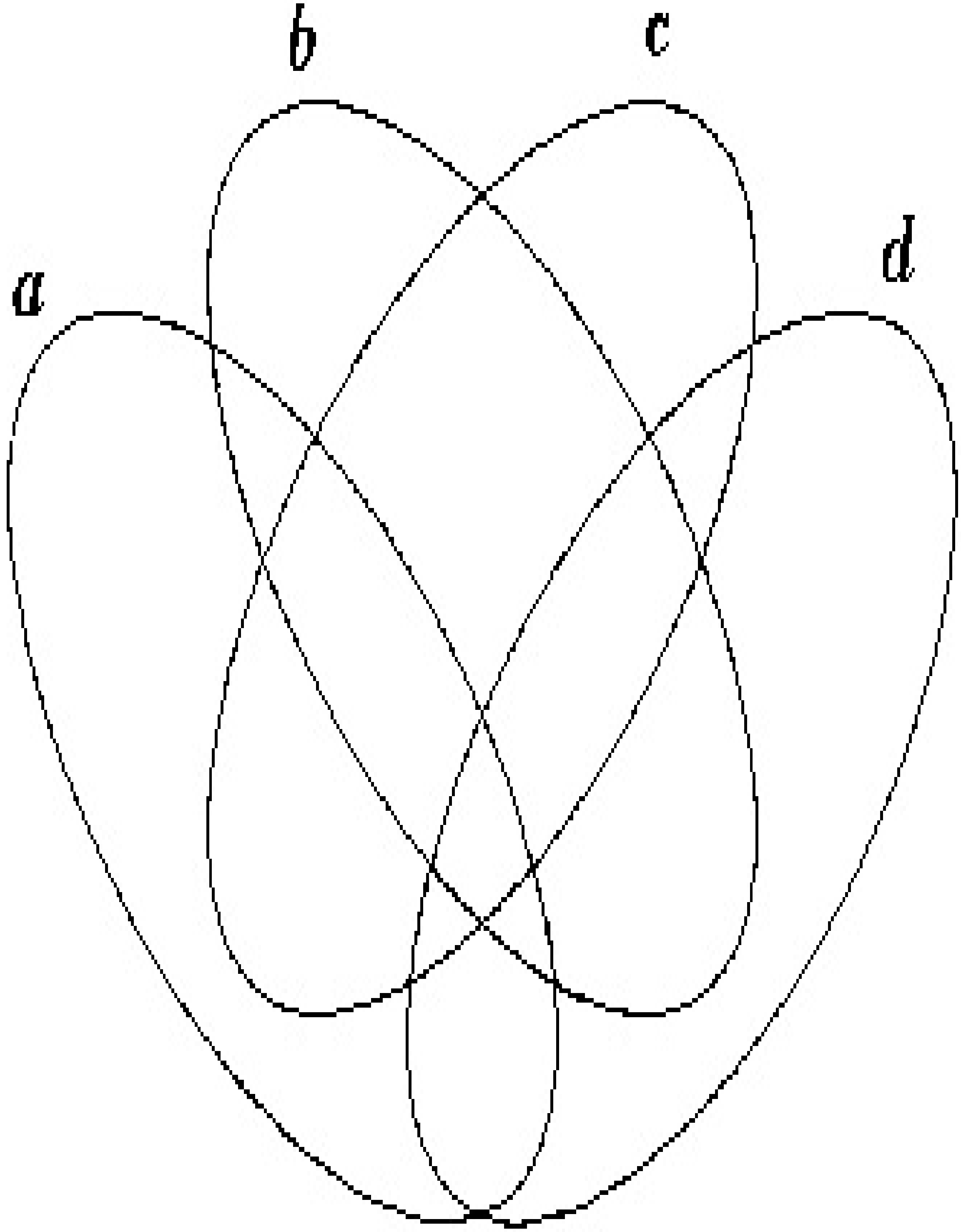
This arrangement would involve us in very serious trouble, if we ever attempted to represent “No x′ are y′.” Mr. Venn once (at p. 281) encounters this awful task; but evades it, in a quite masterly fashion, by the simple foot-note “We have not troubled to shade the outside of this diagram”!

To represent two Propositions (containing a common Term) together, a three-letter Diagram is needed. This is the one used by Mr. Venn.

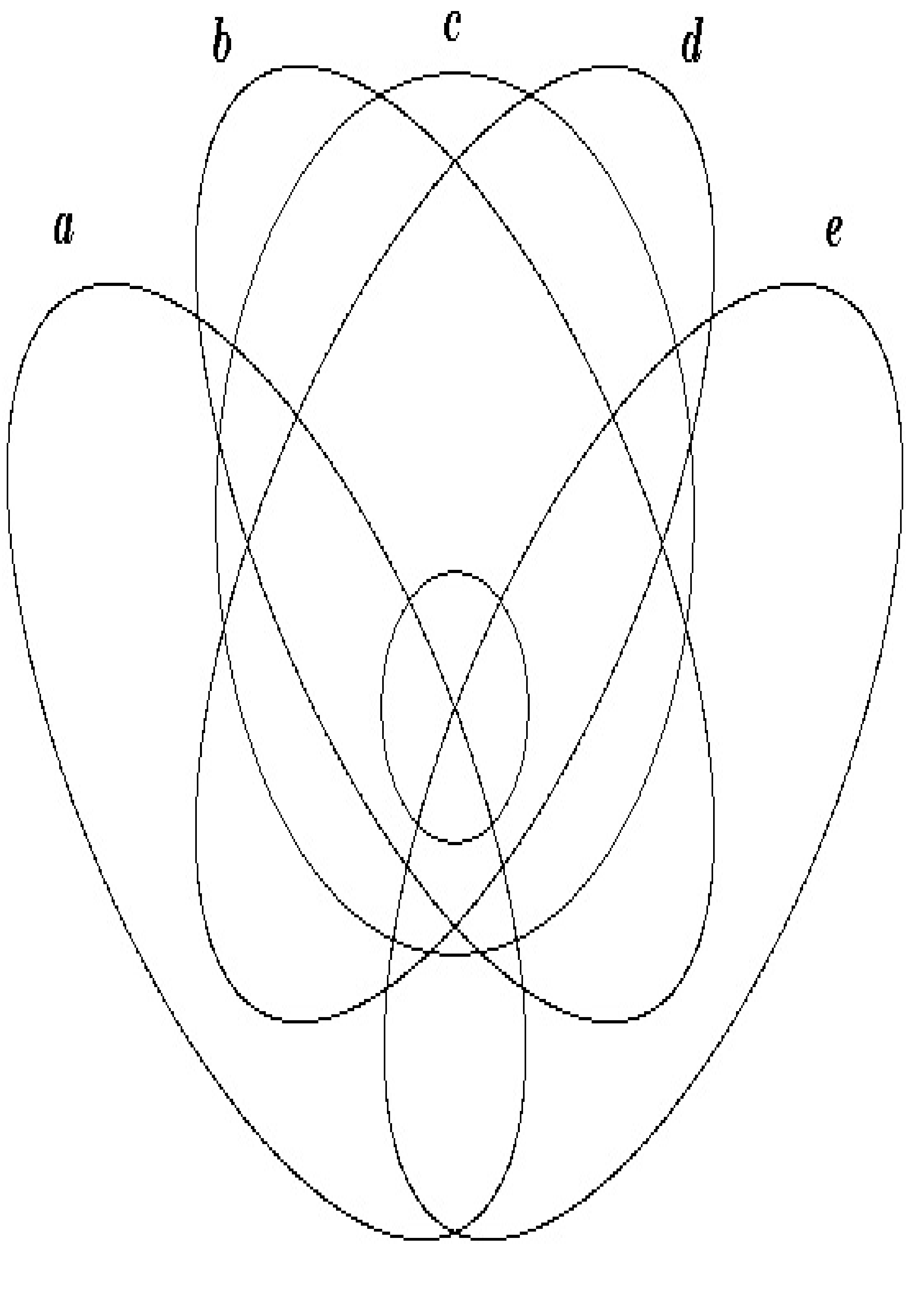

x
m
y

Here, again, we have only seven closed Compartments, to accommodate the eight Classes whose peculiar Sets of Attributes are xym, xym′, &c.

“With four terms in request,” Mr. Venn says, “the most simple and symmetrical diagram seems to me that produced by making four ellipses intersect one another in the desired manner”. This, however, provides only fifteen closed compartments.


a
b
c
d

For five letters, “the simplest diagram I can suggest,” Mr. Venn says, “is one like this (the small ellipse in the centre is to be regarded as a portion of the outside of c; i.e. its four component portions are inside b and d but are no part of c). It must be admitted that such a diagram is not quite so simple to draw as one might wish it to be; but then consider what the alternative is of one undertakes to deal with five terms and all their combinations—nothing short of the disagreeable task of writing out, or in some way putting before us, all the 32 combinations involved.”


a
b
c
d
e

This Diagram gives us 31 closed compartments.

For six letters, Mr. Venn suggests that we might use two Diagrams, like the above, one for the f-part, and the other for the not-f-part, of all the other combinations. “This”, he says, “would give the desired 64 subdivisions.” This, however, would only give 62 closed Compartments, and one infinite area, which the two Classes, a′b′c′d′e′f and a′b′c′d′e′f′, would have to share between them.

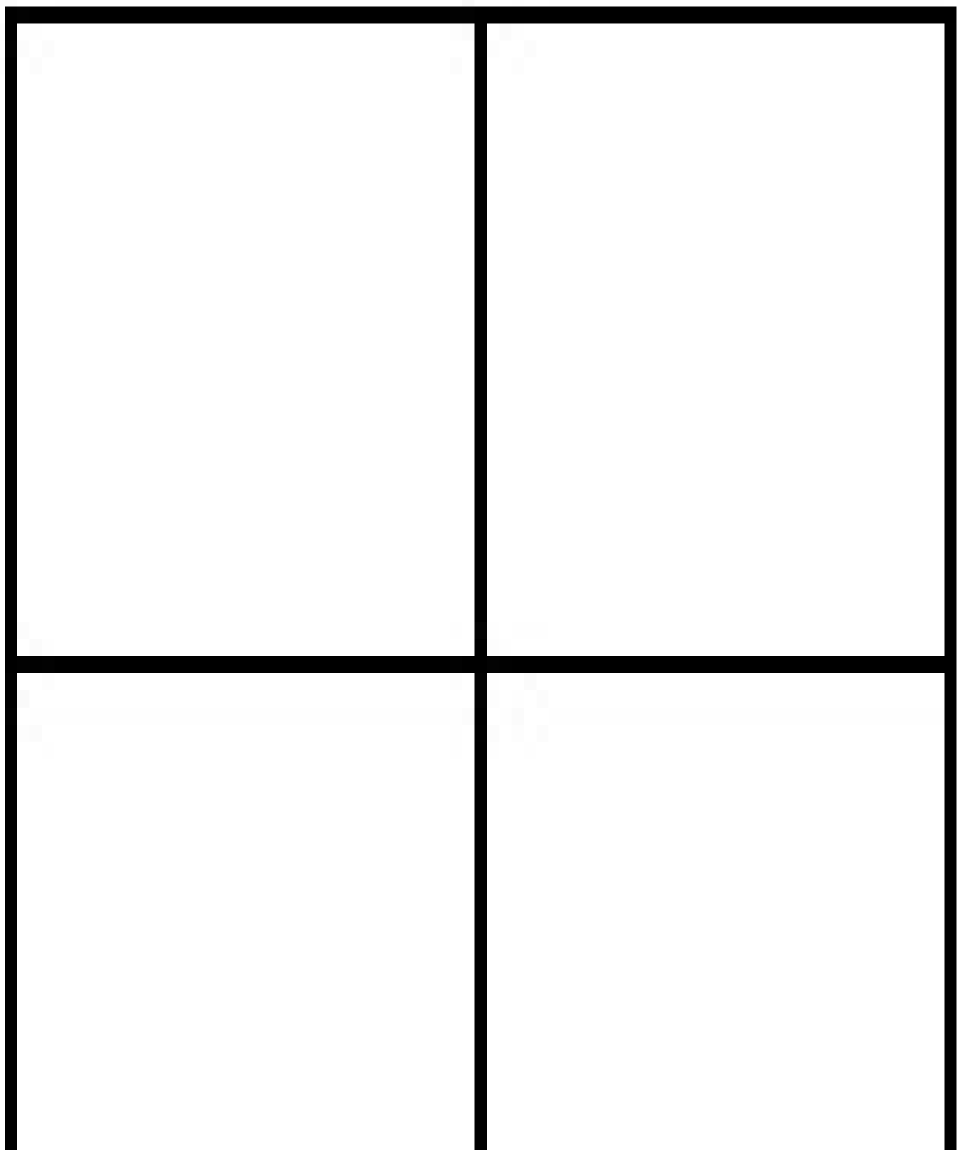
Beyond six letters Mr. Venn does not go.

§ 7.

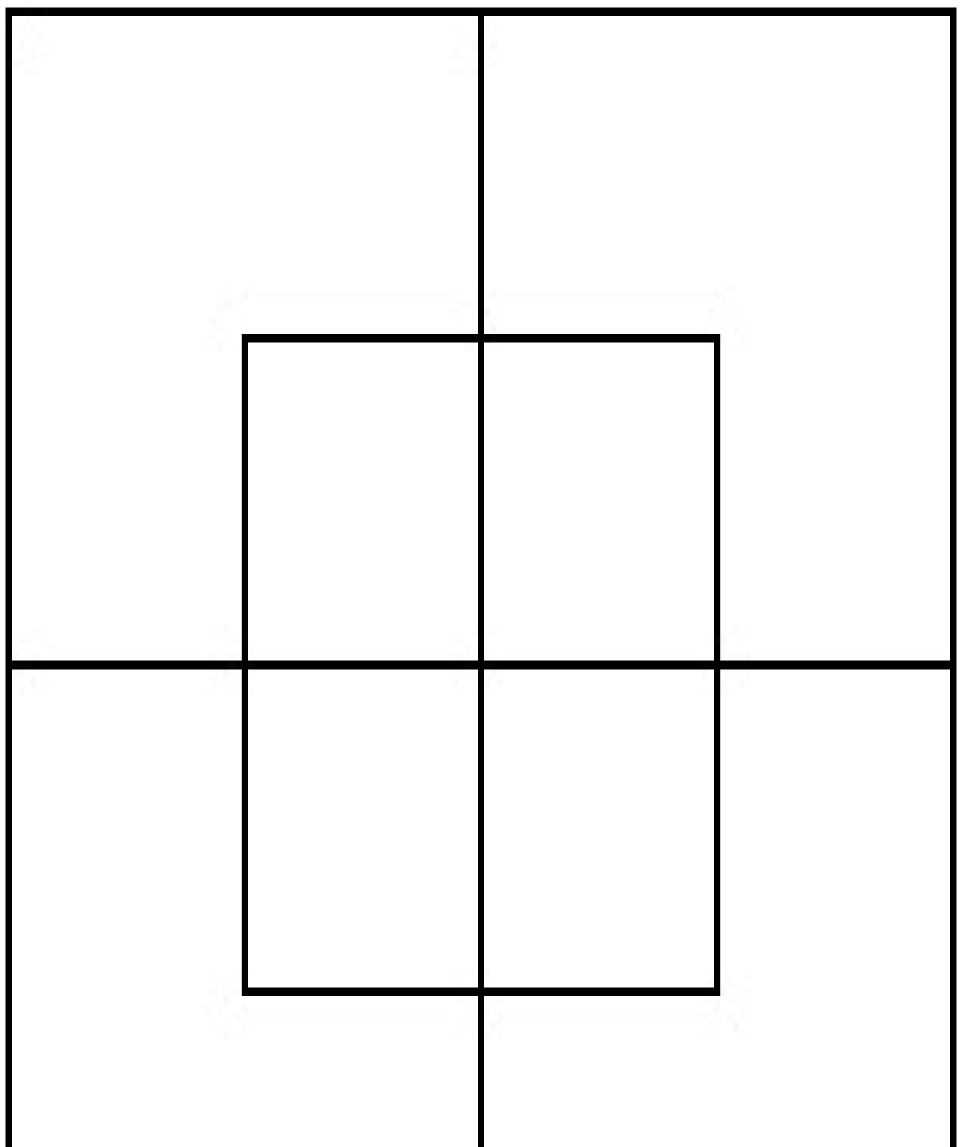
My Method of Diagrams.

My Method of Diagrams resembles Mr. Venn’s, in having separate Compartments assigned to the various Classes, and in marking these Compartments as occupied or as empty; but it differs from his Method, in assigning a closed area to the Universe of Discourse, so that the Class which, under Mr. Venn’s liberal sway, has been ranging at will through Infinite Space, is suddenly dismayed to find itself “cabin’d, cribb’d, confined”, in a limited Cell like any other Class! Also I use rectilinear, instead of curvilinear, Figures; and I mark an occupied Cell with a ‘I’ (meaning that there is at least one Thing in it), and an empty Cell with a ‘O’ (meaning that there is no Thing in it).

For two letters, I use this Diagram, in which the North Half is assigned to ‘x’, the South to ‘not-x’ (or ‘x′’), the West to y, and the East to y′. Thus the N.W. Cell contains the xy-Class, the N.E. Cell the xy′-Class, and so on.

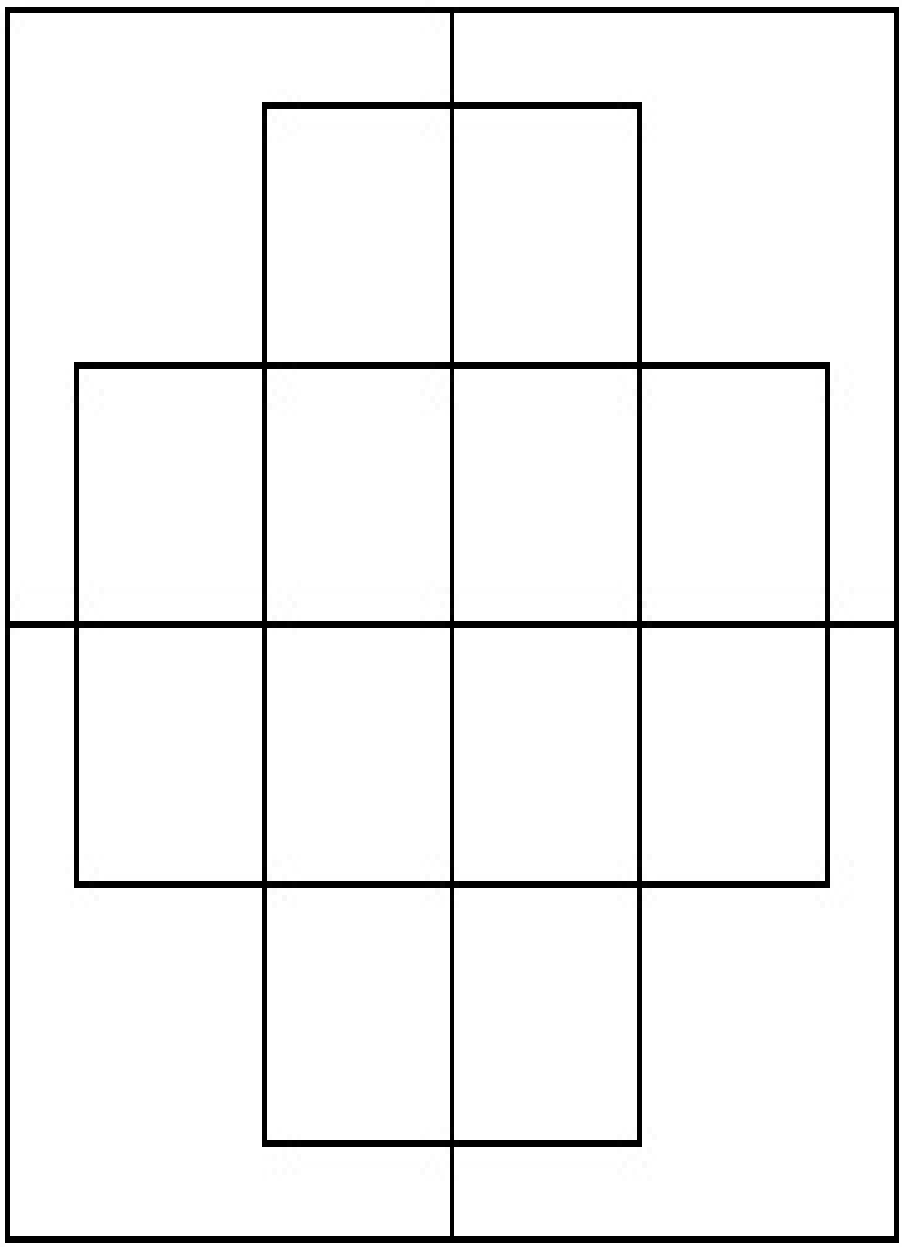


For three letters, I subdivide these four Cells, by drawing an Inner Square, which I assign to m, the Outer Border being assigned to m′. I thus get eight Cells that are needed to accommodate the eight Classes, whose peculiar Sets of Attributes are xym, xym′, &c.

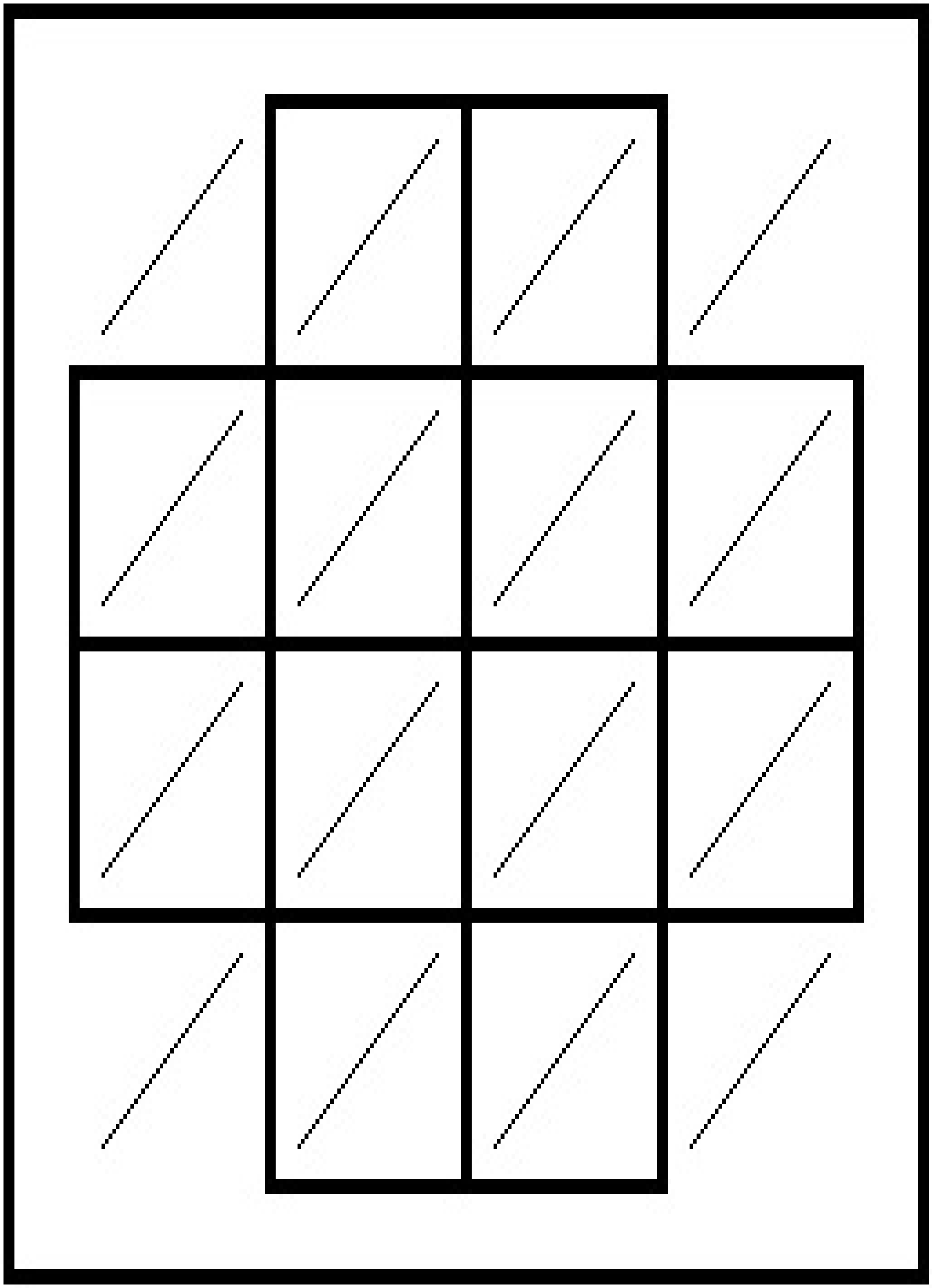


This last Diagram is the most complex that I use in the Elementary Part of my ‘Symbolic Logic.’ But I may as well take this opportunity of describing the more complex ones which will appear in Part II.

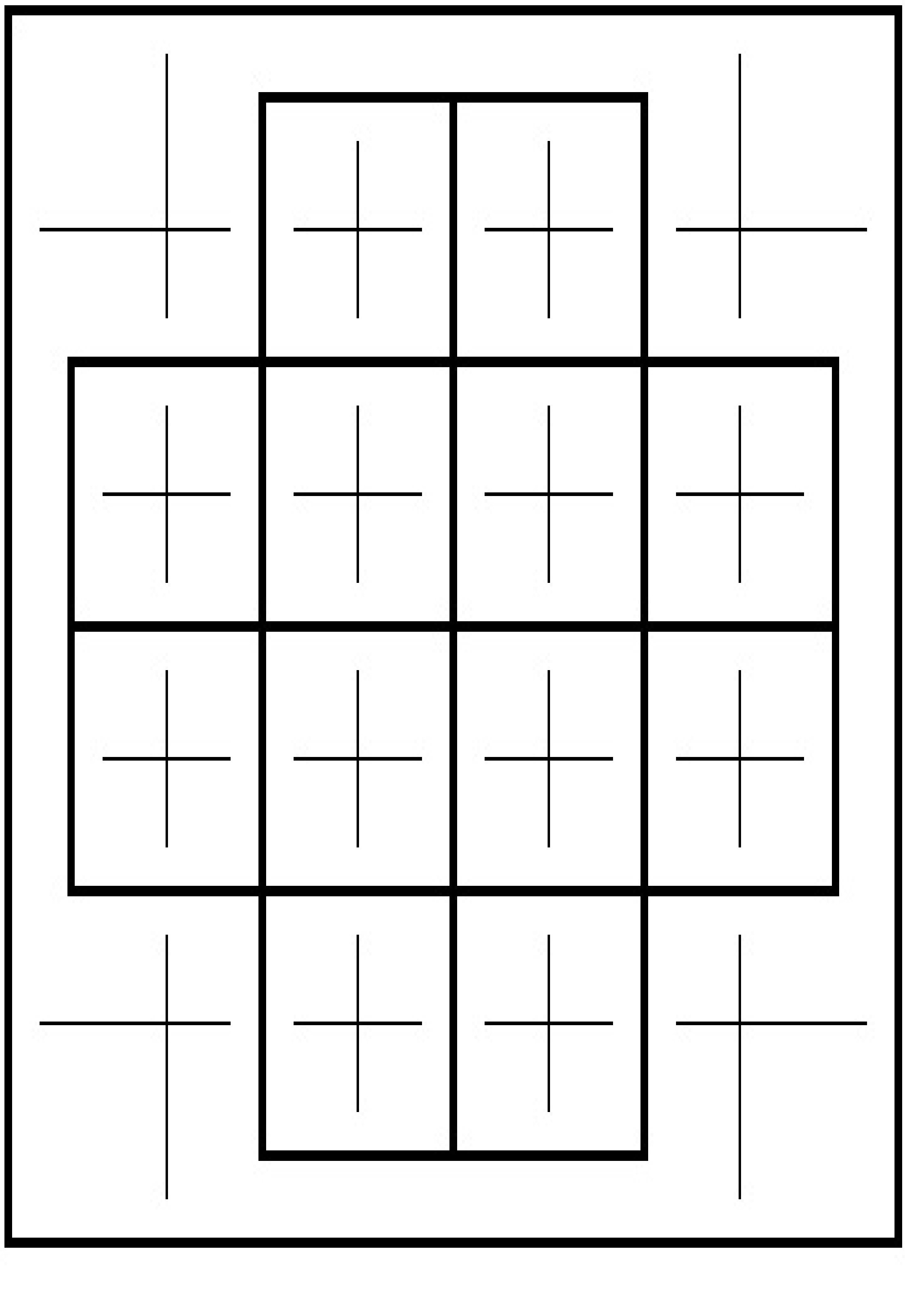
For four letters (which I call a, b, c, d) I use this Diagram; assigning the North Half to a (and of course the rest of the Diagram to a′), the West Half to b, the Horizontal Oblong to c, and the Upright Oblong to d. We have now got 16 Cells.



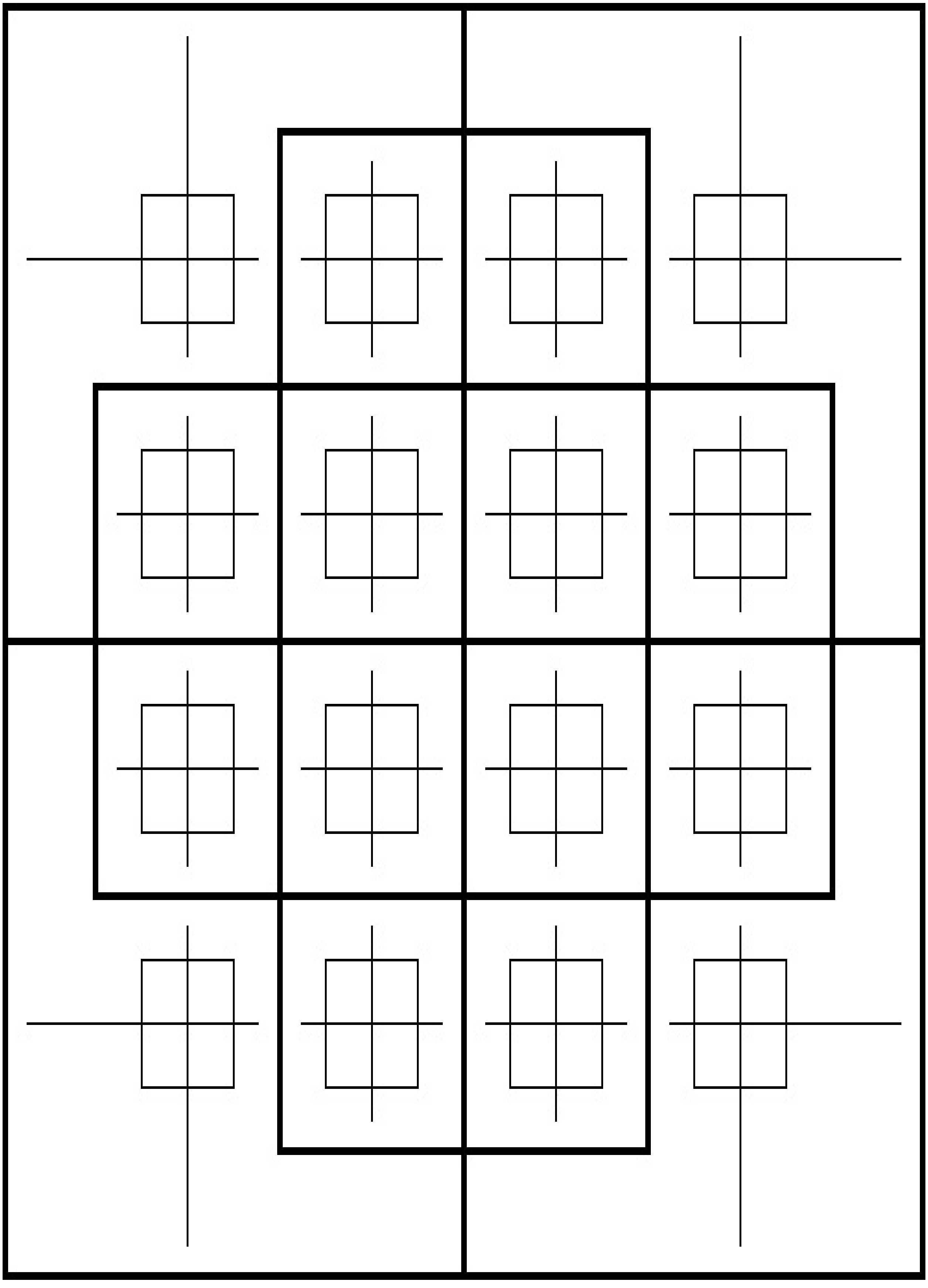
For five letters (adding e) I subdivide the 16 Cells of the previous Diagram by oblique partitions, assigning all the upper portions to e, and all the lower portions to e′. Here, I admit, we lose the advantage of having the e-Class all together, “in a ring-fence”, like the other 4 Classes. Still, it is very easy to find; and the operation, of erasing it, is nearly as easy as that of erasing any other Class. We have now got 32 Cells.



For six letters (adding h, as I avoid tailed letters) I substitute upright crosses for the oblique partitions, assigning the 4 portions, into which each of the 16 Cells is thus divided, to the four Classes eh, eh′, e′h, e′h′. We have now got 64 Cells.

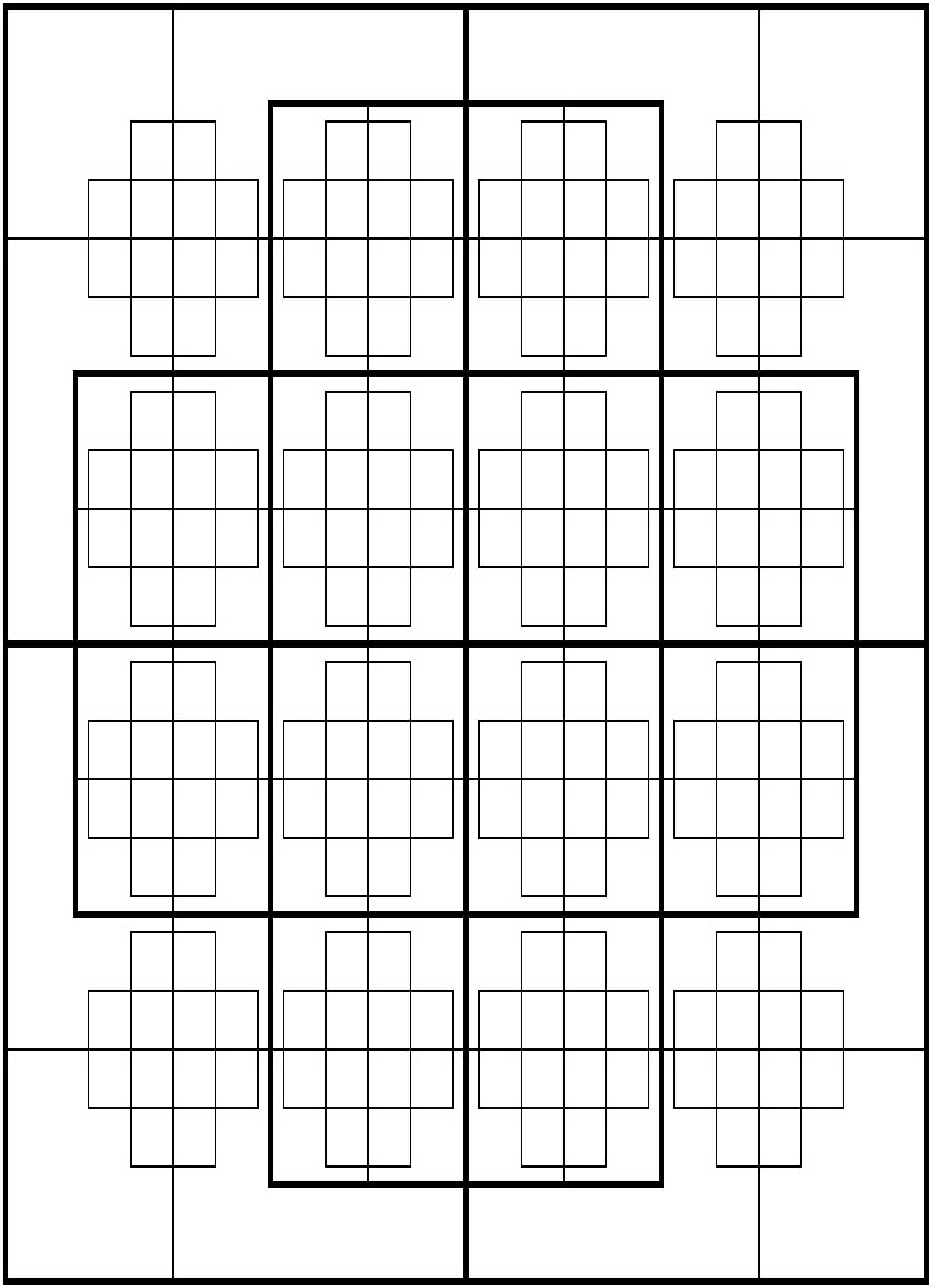


For seven letters (adding k) I add, to each upright cross, a little inner square. All these 16 little squares are assigned to the k-Class, and all outside them to the k′-Class; so that 8 little Cells (into which each of the 16 Cells is divided) are respectively assigned to the 8 Classes ehk, ehk′, &c. We have now got 128 Cells.



For eight letters (adding l) I place, in each of the 16 Cells, a lattice, which is a reduced copy of the whole Diagram; and, just as the 16 large Cells of the whole Diagram are assigned to the 16 Classes abcd, abcd′, &c., so the 16 little Cells of each lattice are assigned to the 16 Classes ehkl, ehkl′, &c. Thus, the lattice in the N.W. corner serves to accommodate the 16 Classes abc′d′ehkl, abc′d′eh′kl′, &c. This Octoliteral Diagram (see next page) contains 256 Cells.

For nine letters, I place 2 Octoliteral Diagrams side by side, assigning one of them to m, and the other to m′. We have now got 512 Cells.



Finally, for ten letters, I arrange 4 Octoliteral Diagrams, like the above, in a square, assigning them to the 4 Classes mn, mn′, m′n, m′n′. We have now got 1024 Cells.

§ 8.

Solution of a Syllogism by various Methods.

The best way, I think, to exhibit the differences between these various Methods of solving Syllogisms, will be to take a concrete example, and solve it by each Method in turn. Let us take, as our example, No. 29 (see p. 102).

“No philosophers are conceited;

Some conceited persons are not gamblers.

∴ Some persons, who are not gamblers, are not philosophers.”

(1) Solution by ordinary Method.

These Premisses, as they stand, will give no Conclusion, as they are both negative.

If by ‘Permutation’ or ‘Obversion’, we write the Minor Premiss thus, ‘Some conceited persons are not-gamblers,’

we can get a Conclusion in Fresison, viz.

“No philosophers are conceited;

Some conceited persons are not-gamblers.

∴ Some not-gamblers are not philosophers”

This can be proved by reduction to Ferio, thus:—

“No conceited persons are philosophers;

Some not-gamblers are conceited.

∴ Some not-gamblers are not philosophers”.

The validity of Ferio follows directly from the Axiom ‘De Omni et Nullo’.

(2) Symbolic Representation.

Before proceeding to discuss other Methods of Solution, it is necessary to translate our Syllogism into an abstract form.

Let us take “persons” as our ‘Universe of Discourse’; and let x = “philosophers”, m = “conceited”, and y = “gamblers.”

Then the Syllogism may be written thus:—

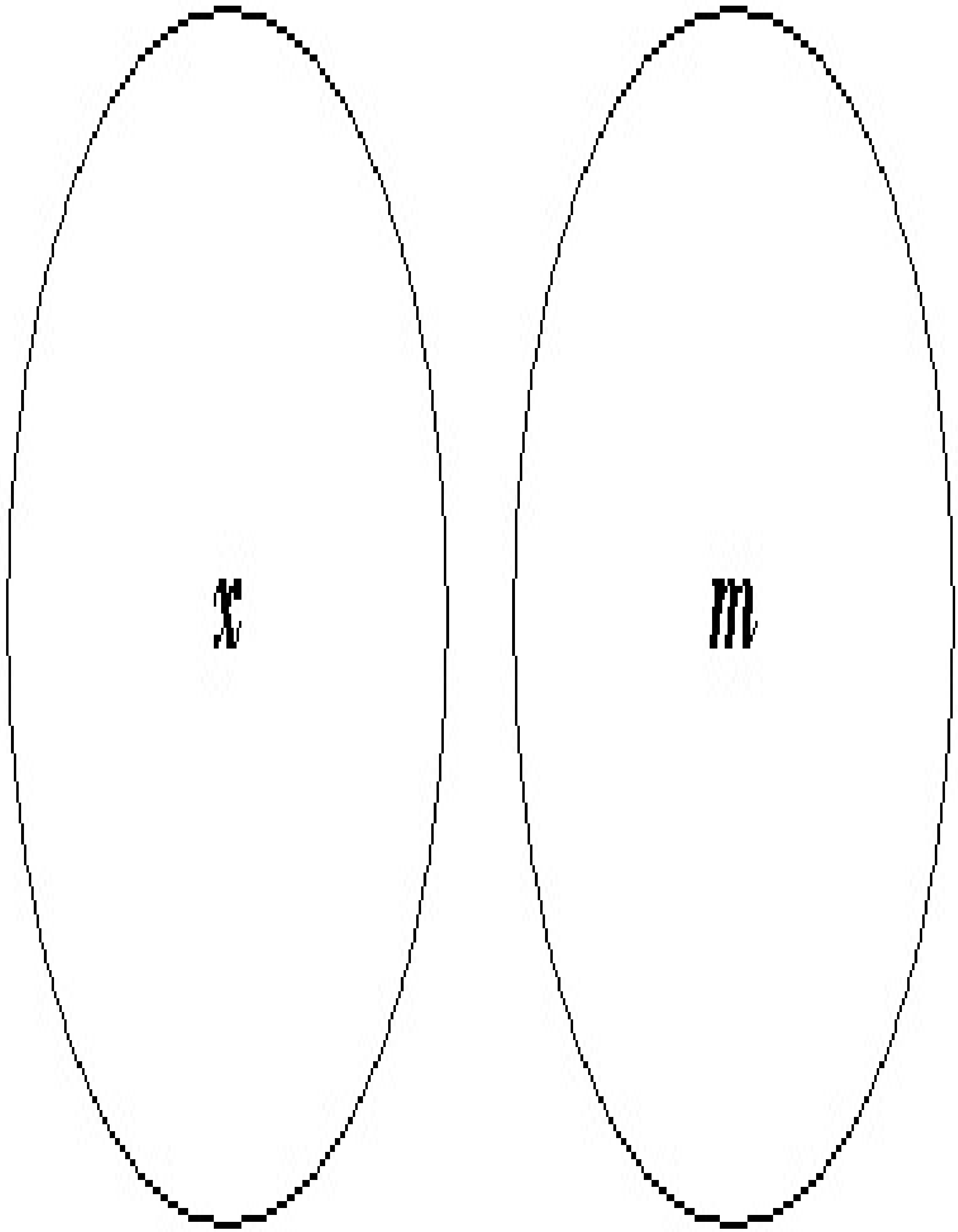
“No x are m;

Some m are y′.

∴ Some y′ are x′.”

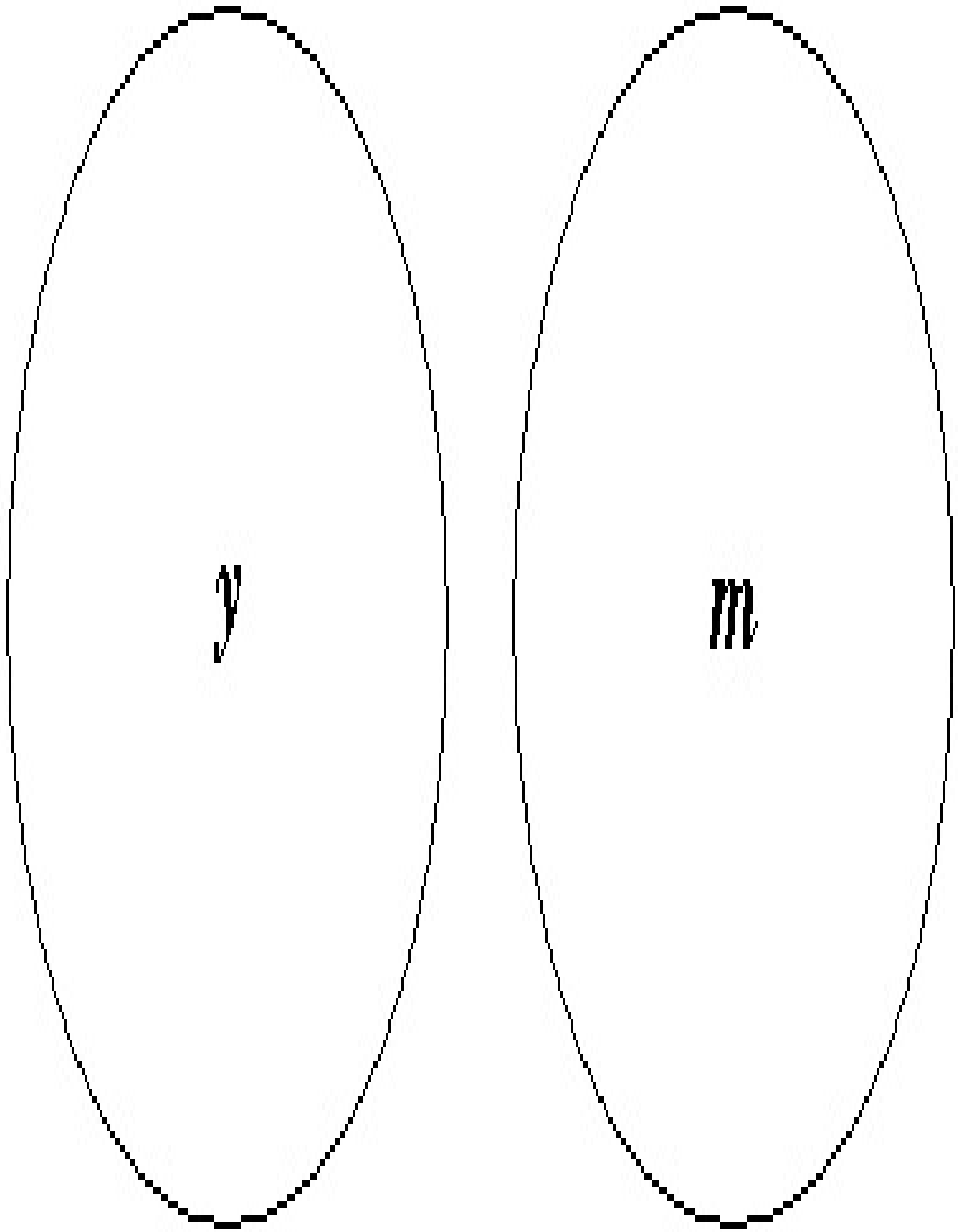
(3) Solution by Euler’s Method of Diagrams.

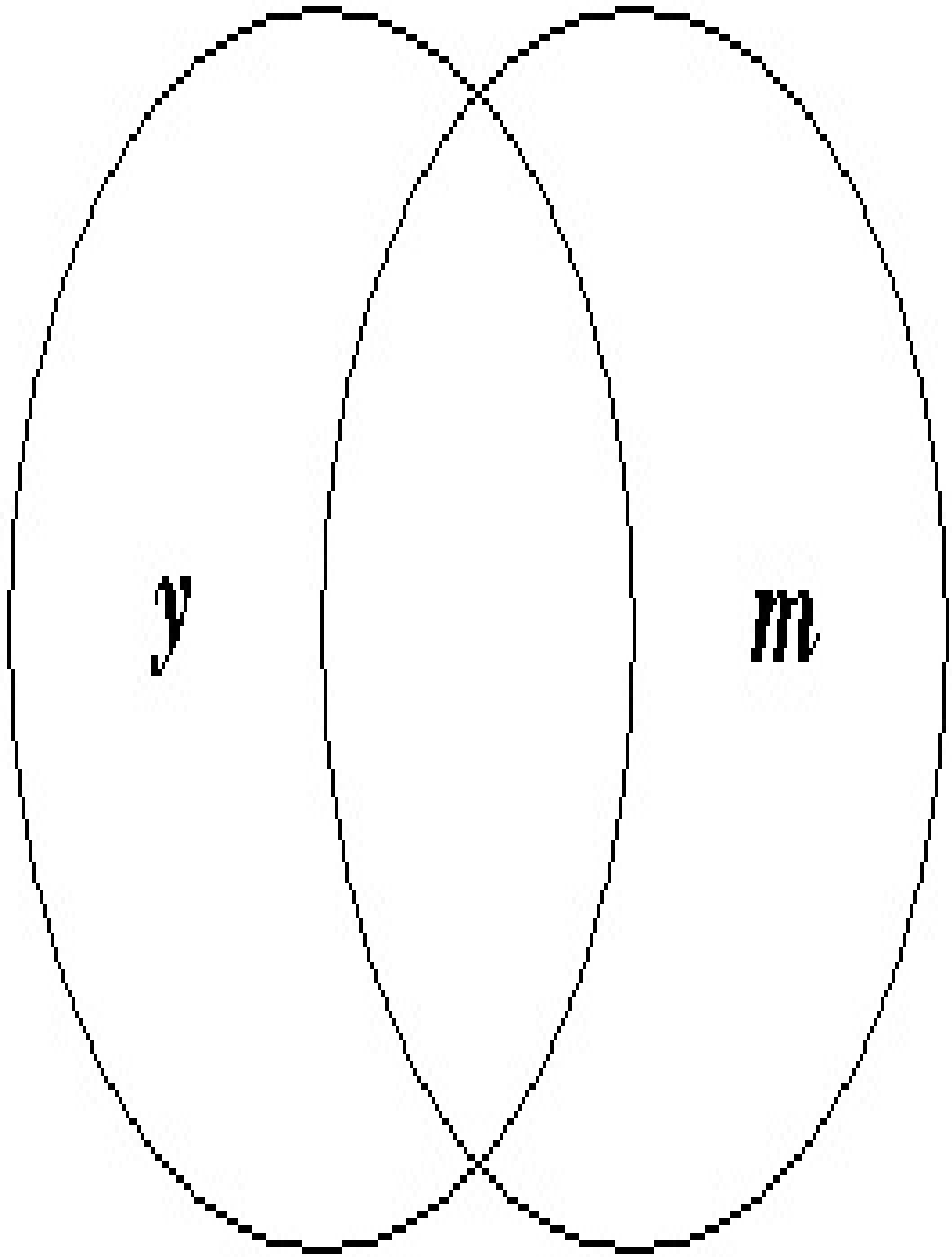
The Major Premiss requires only one Diagram, viz.


x
m

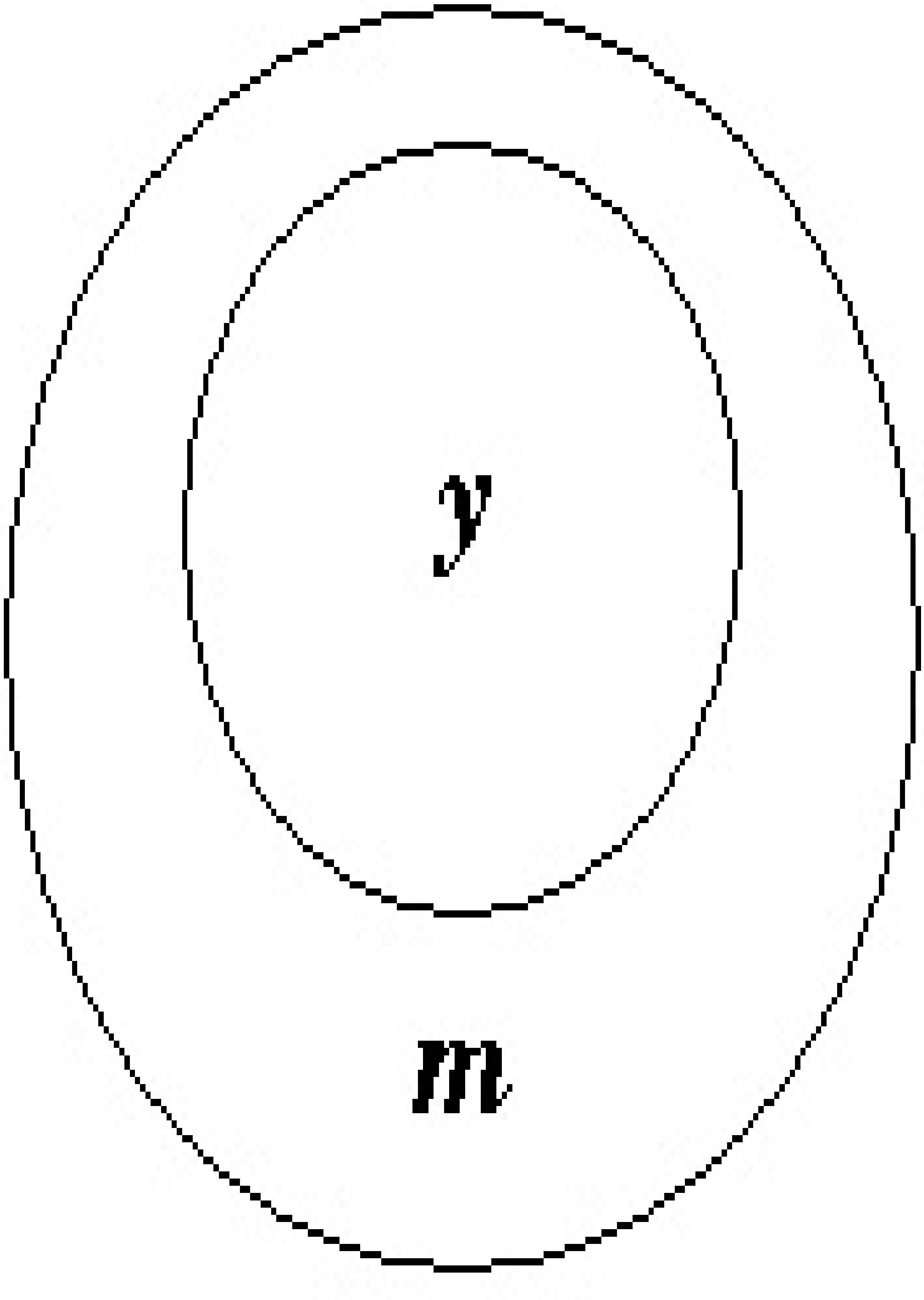
The Minor requires three, viz.

2


y
m

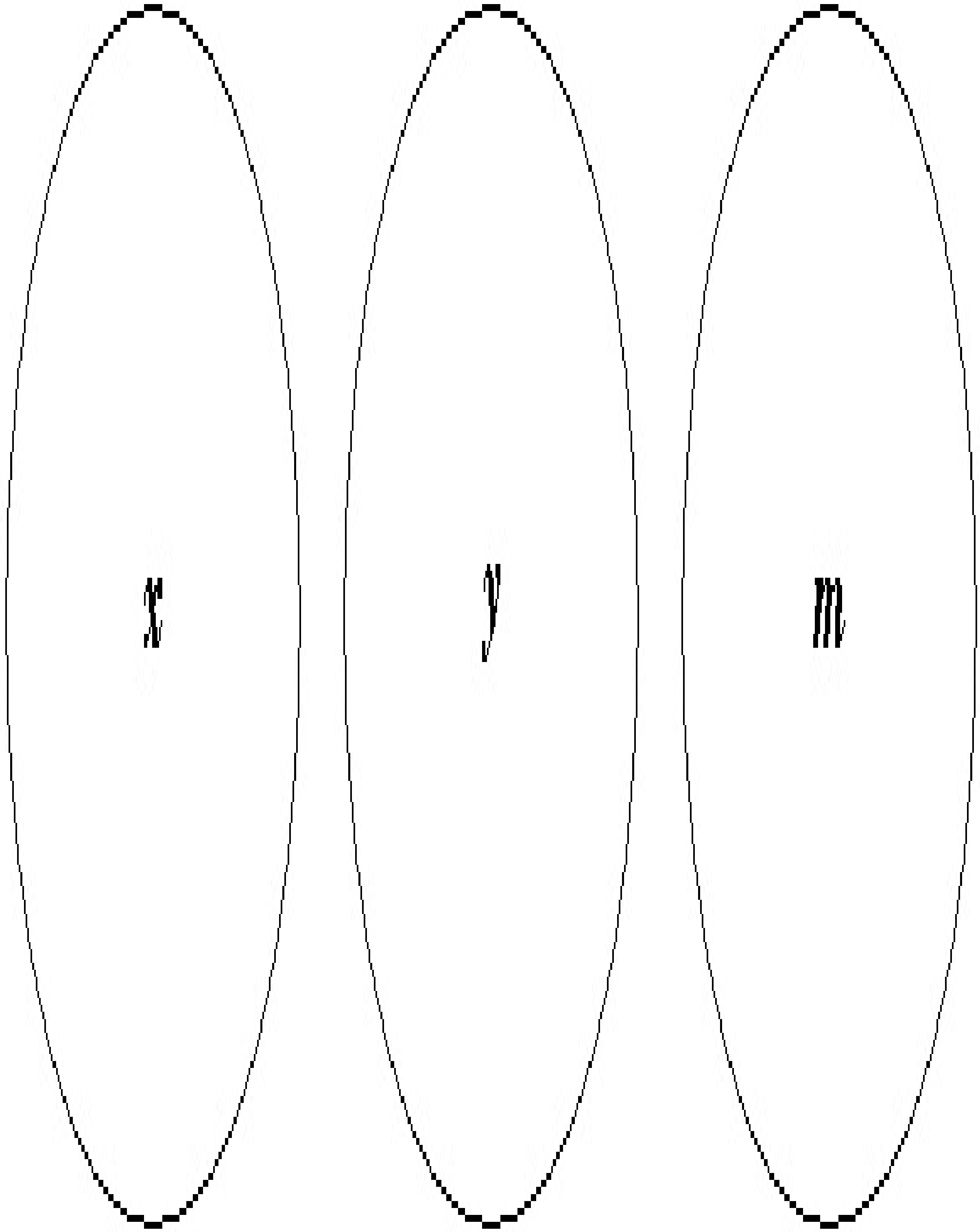


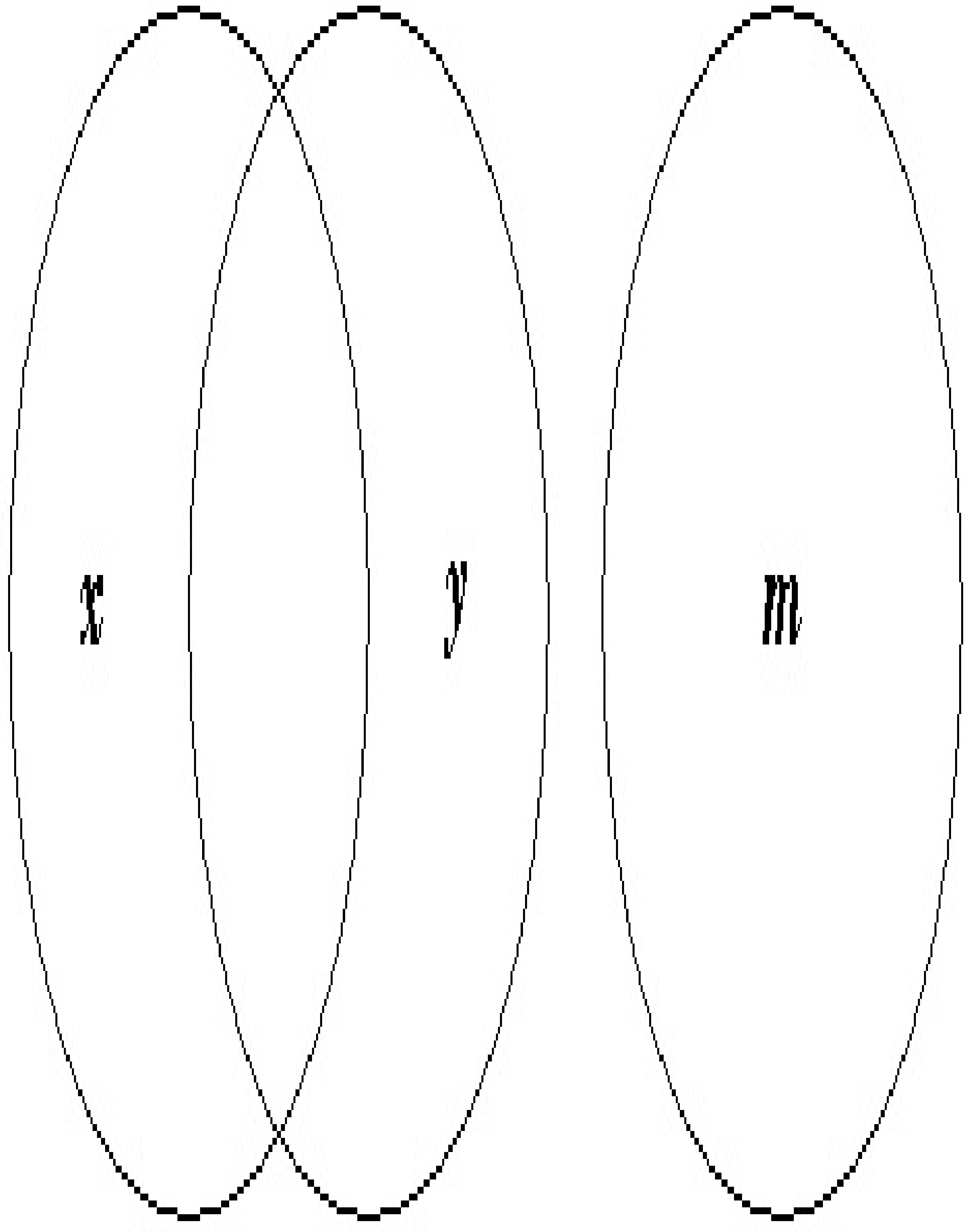
y
m


y
m

The combination of Major and Minor, in every possible way requires nine, viz.

Figs. 1 and 2 give


x
y
m


x
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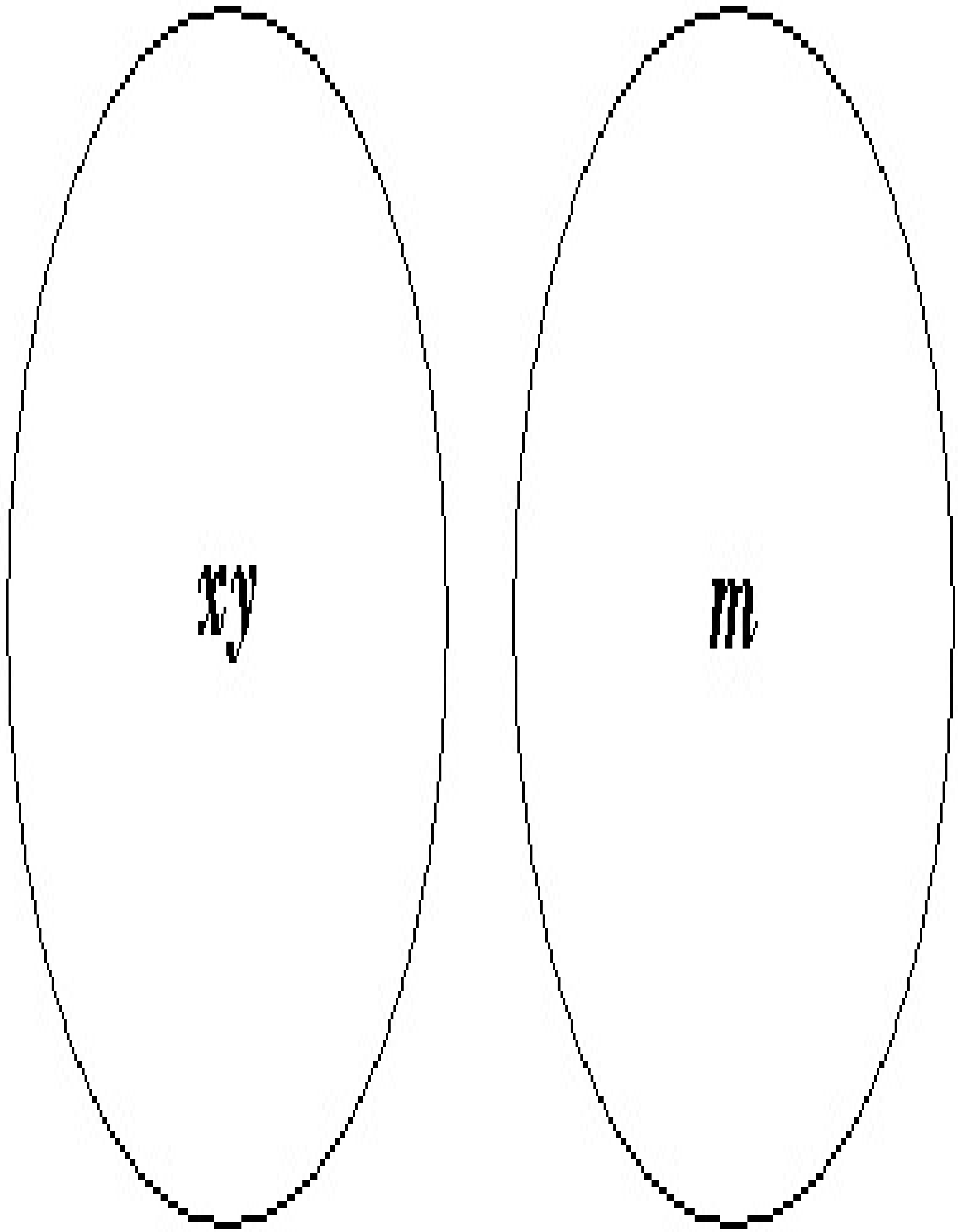
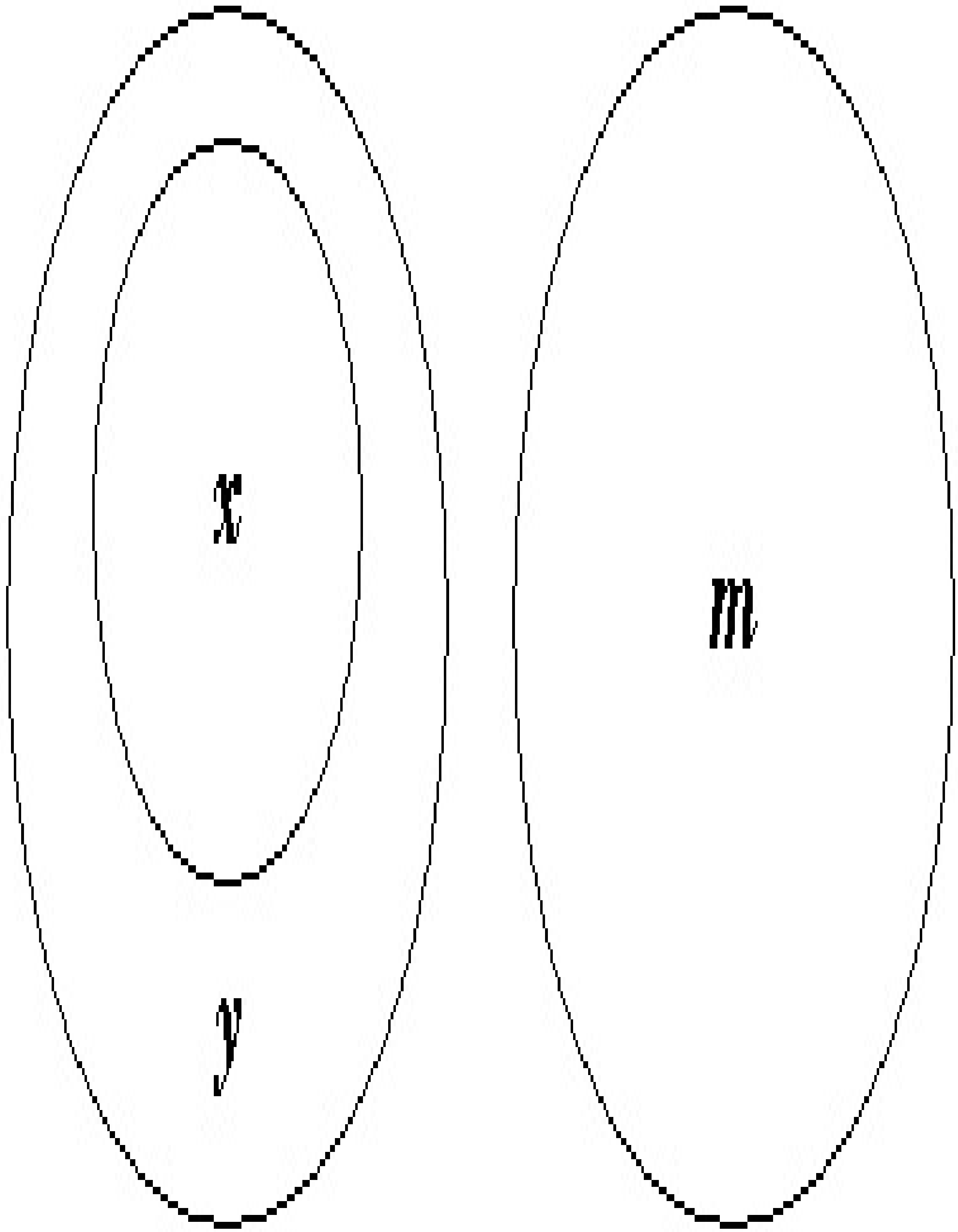
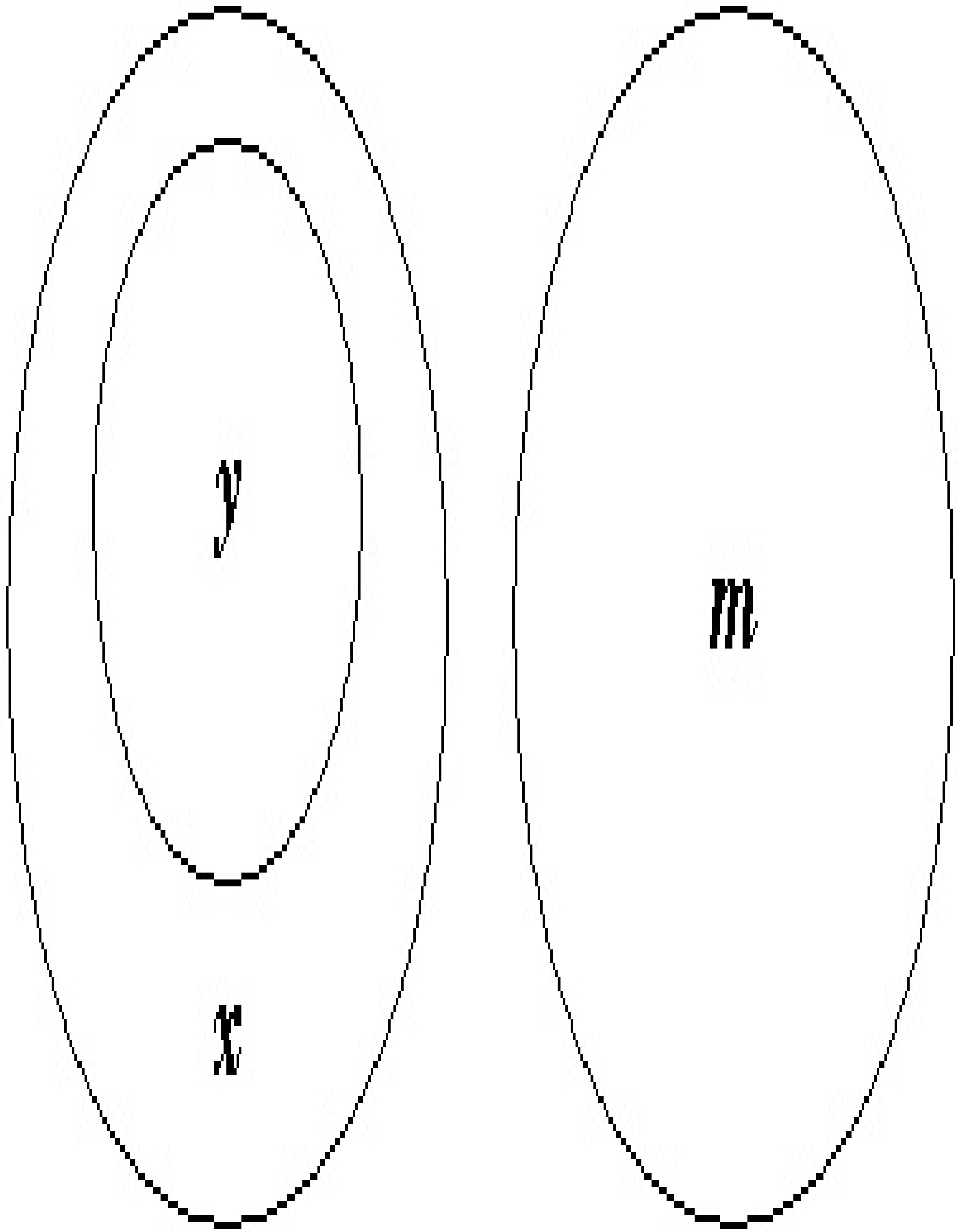
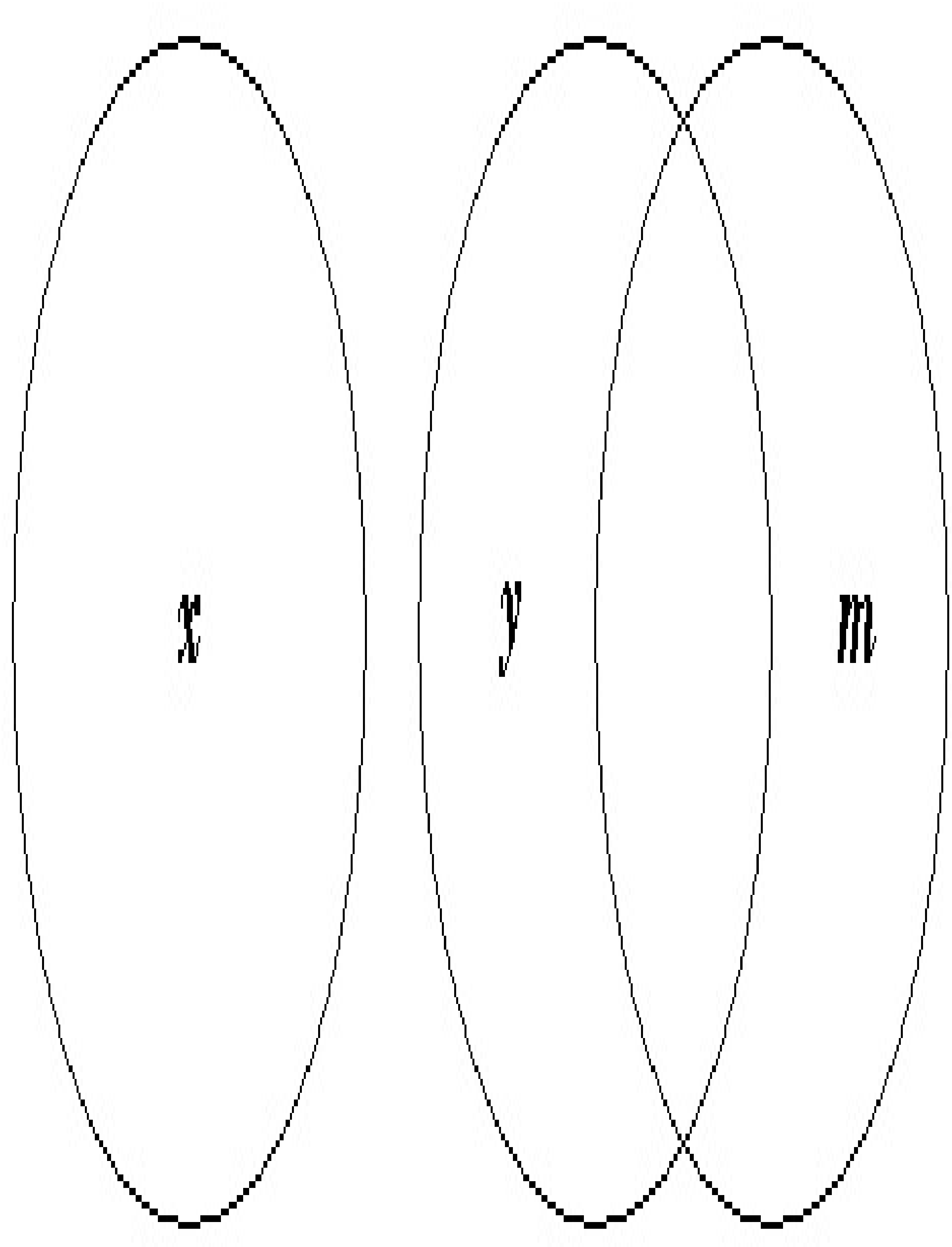

xy
m

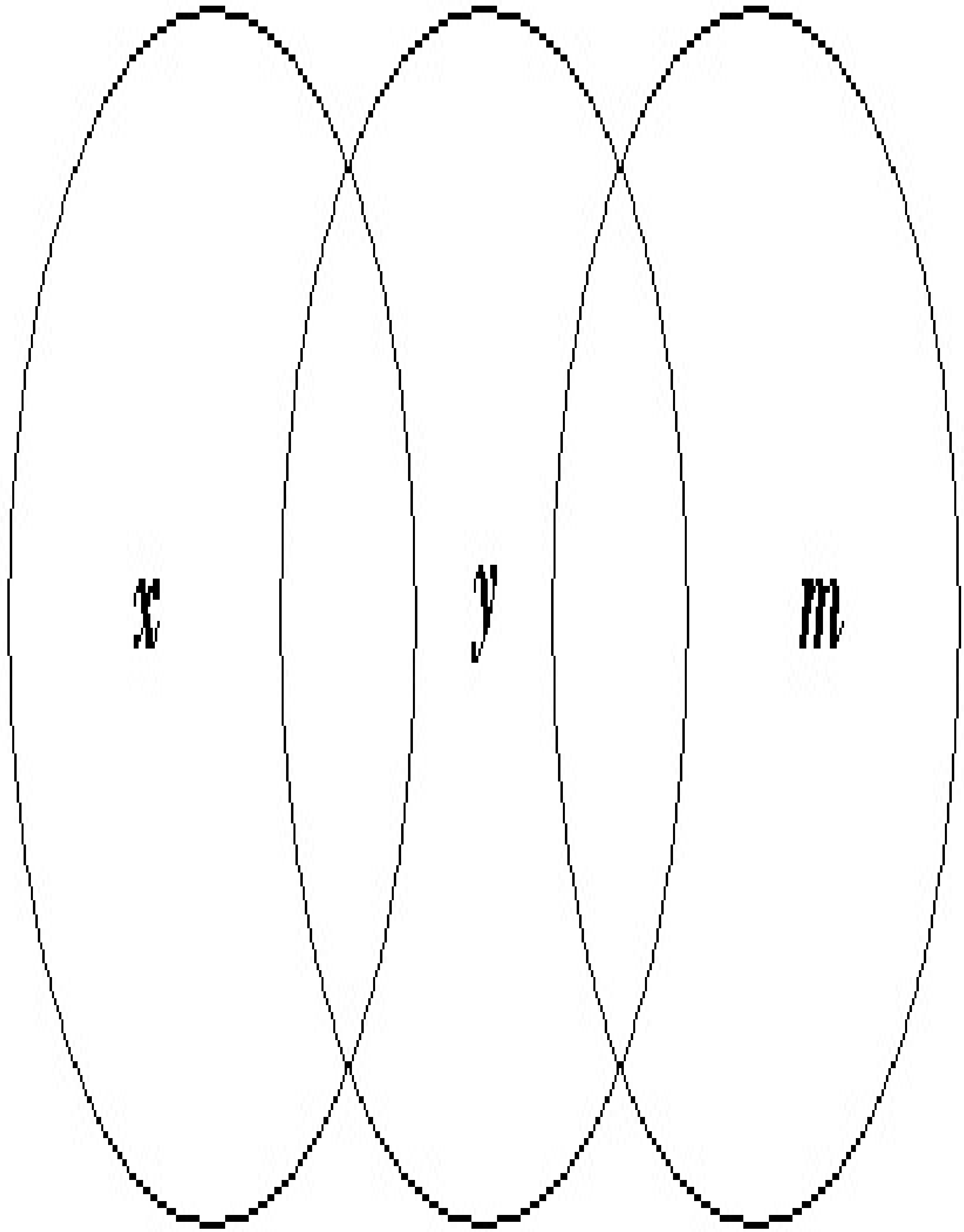


x
y
m


y
x
m

Figs. 1 and 3 give


x
y
m


x
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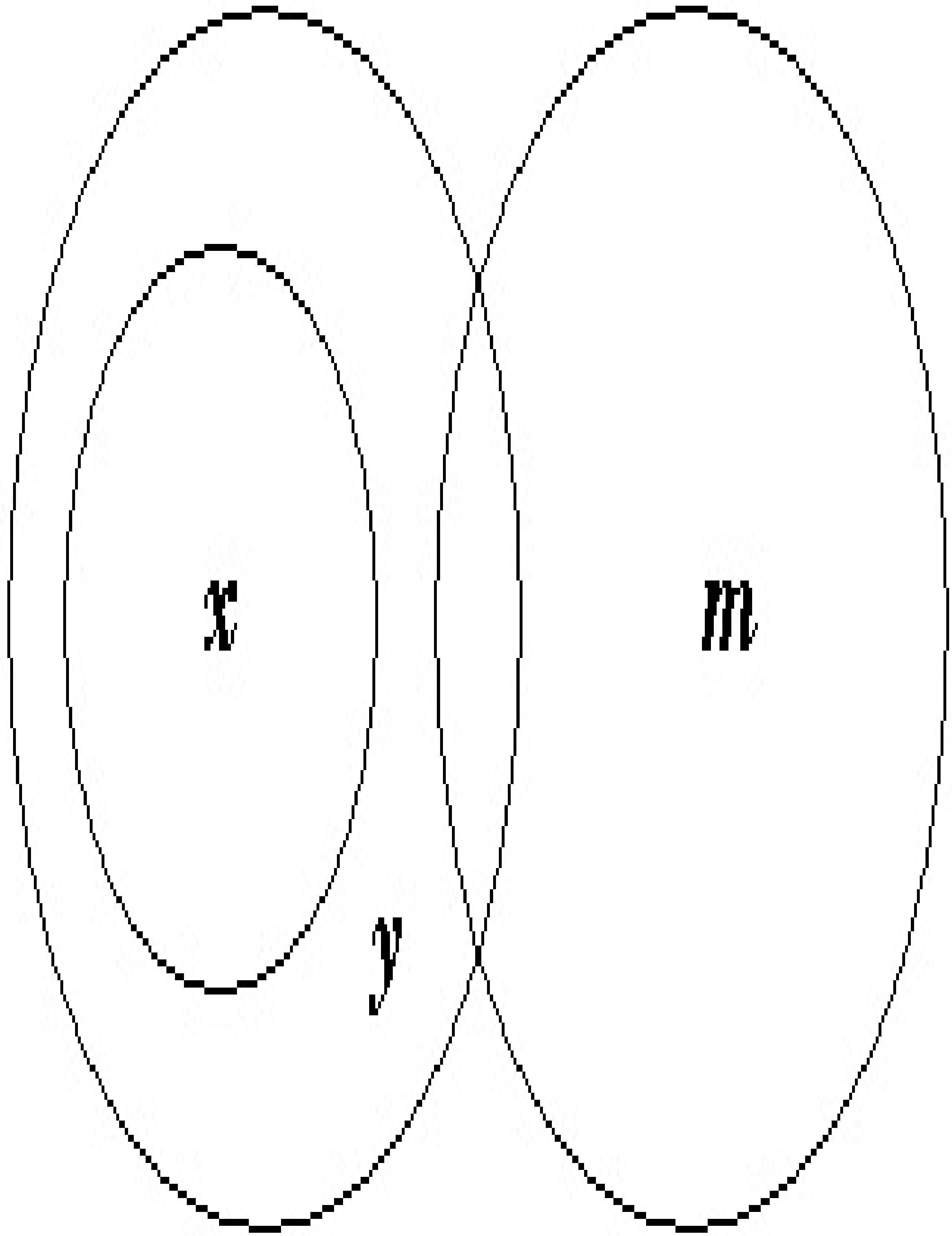
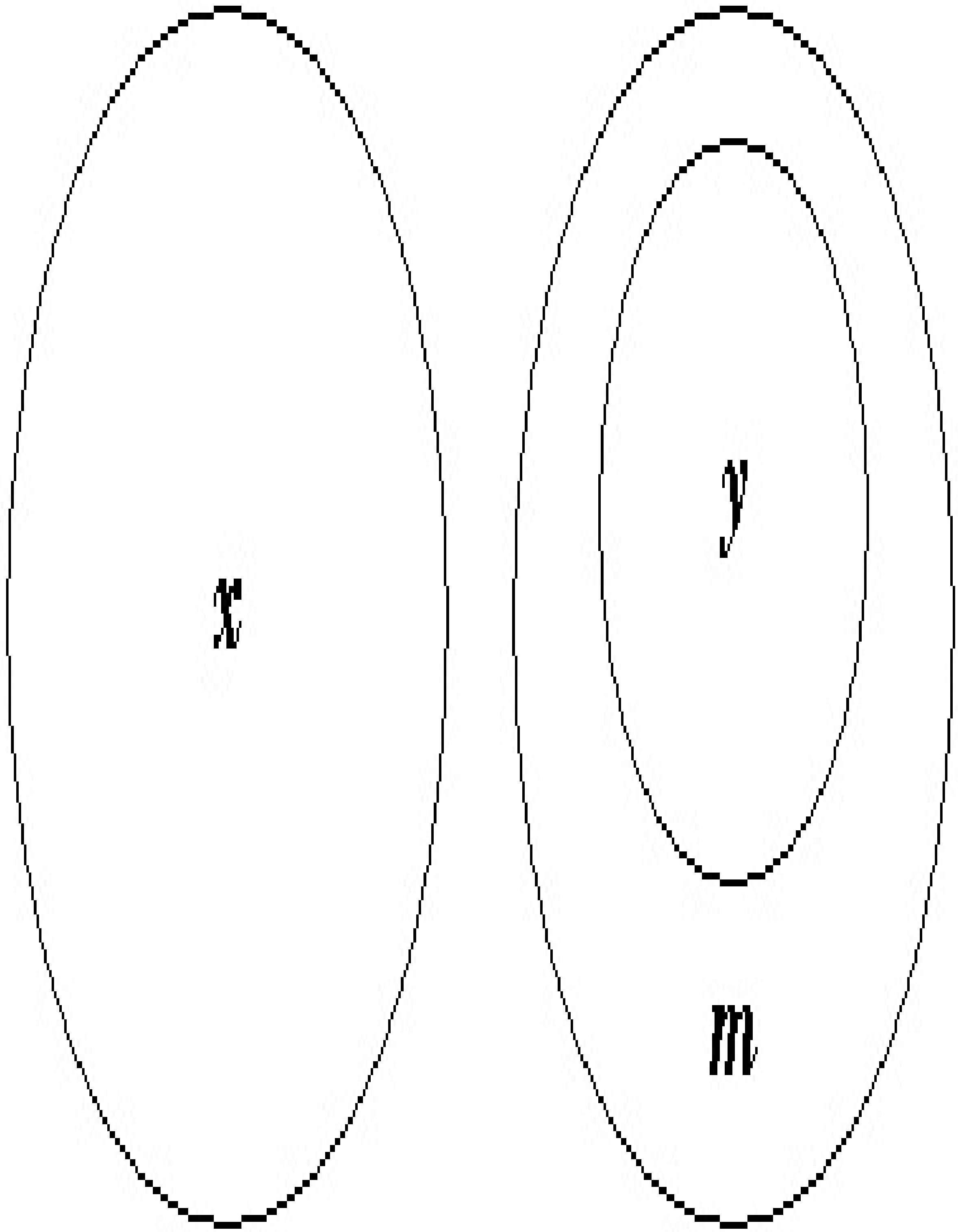
m

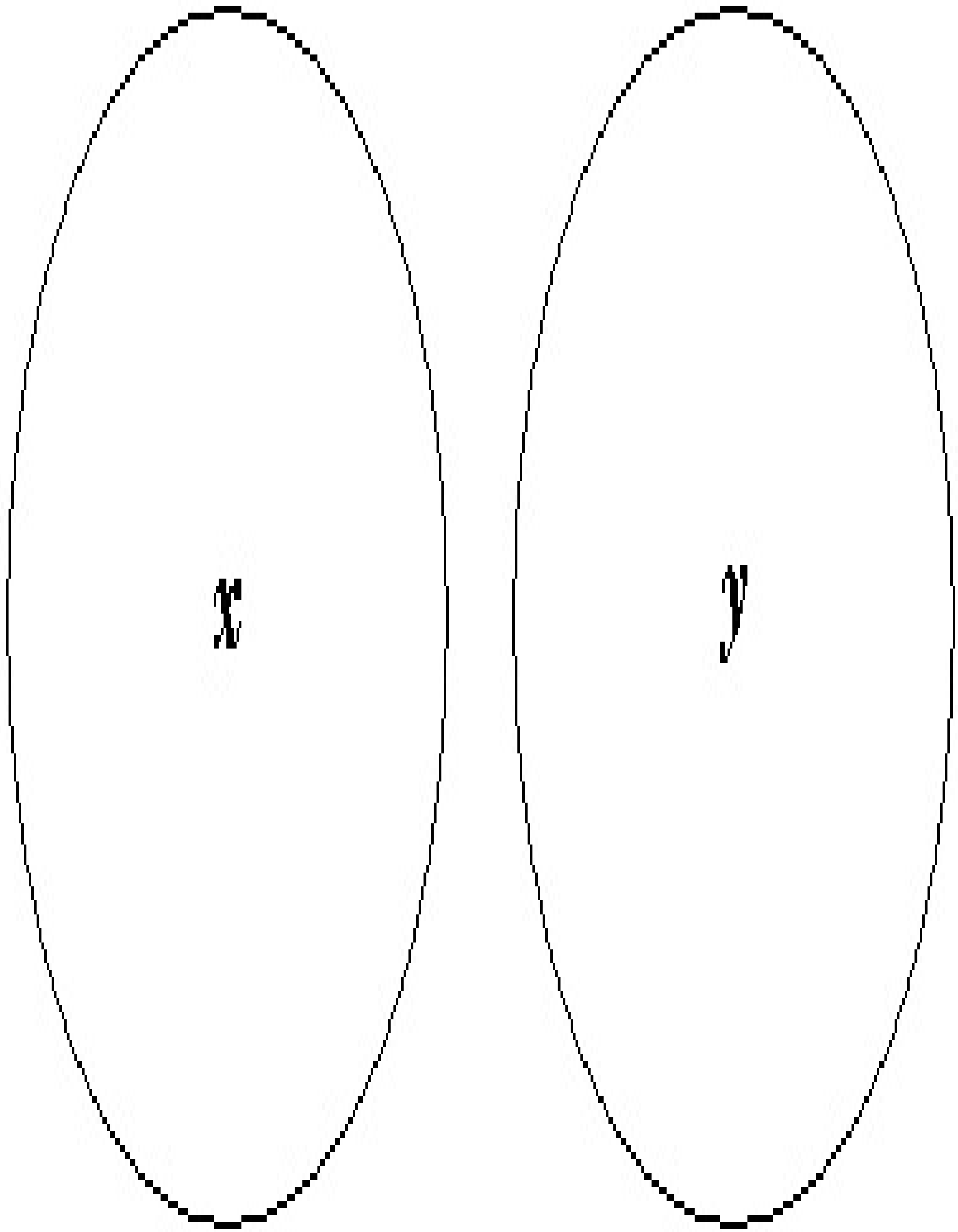

x
y
m

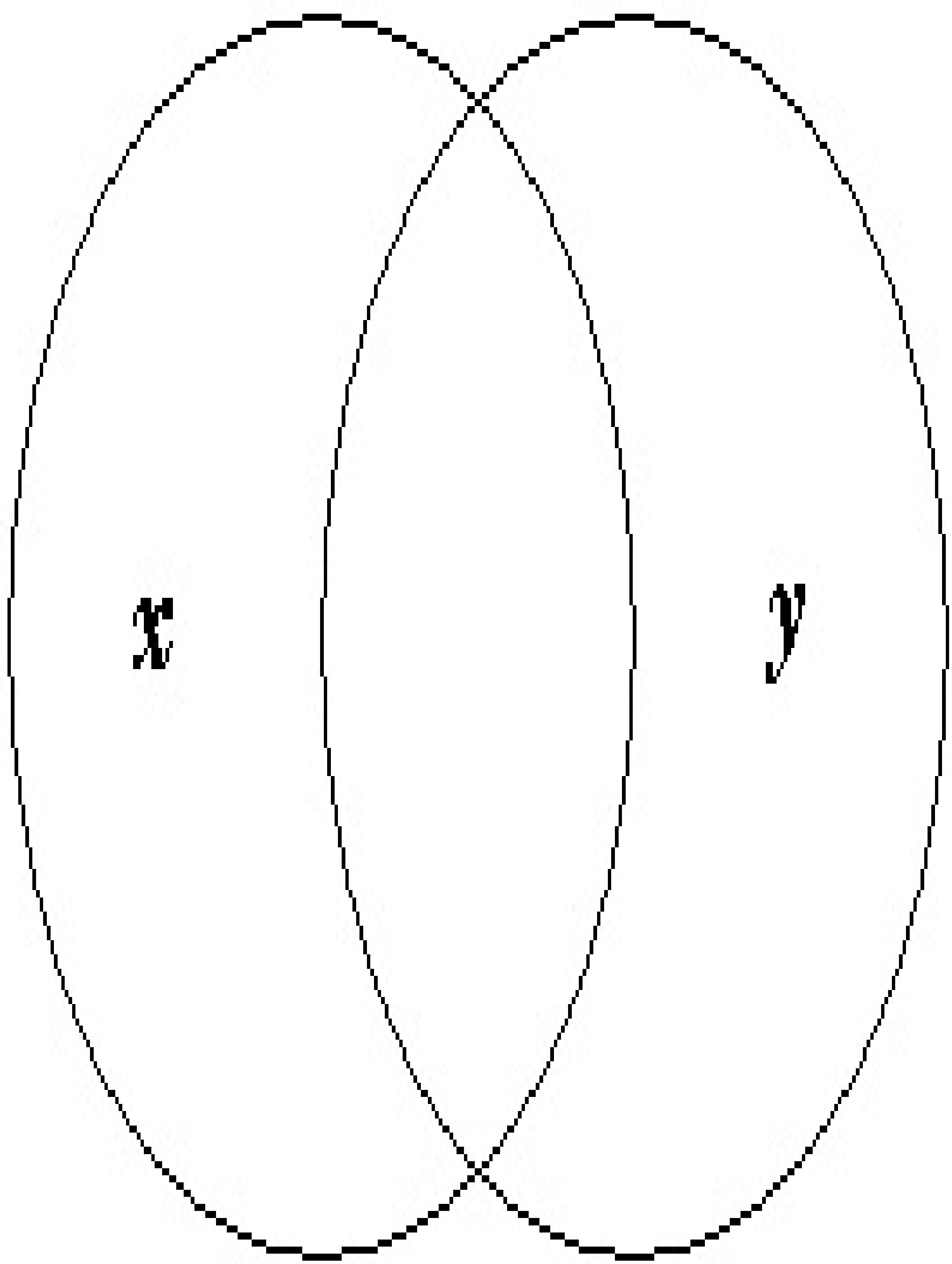
Figs. 1 and 4 give

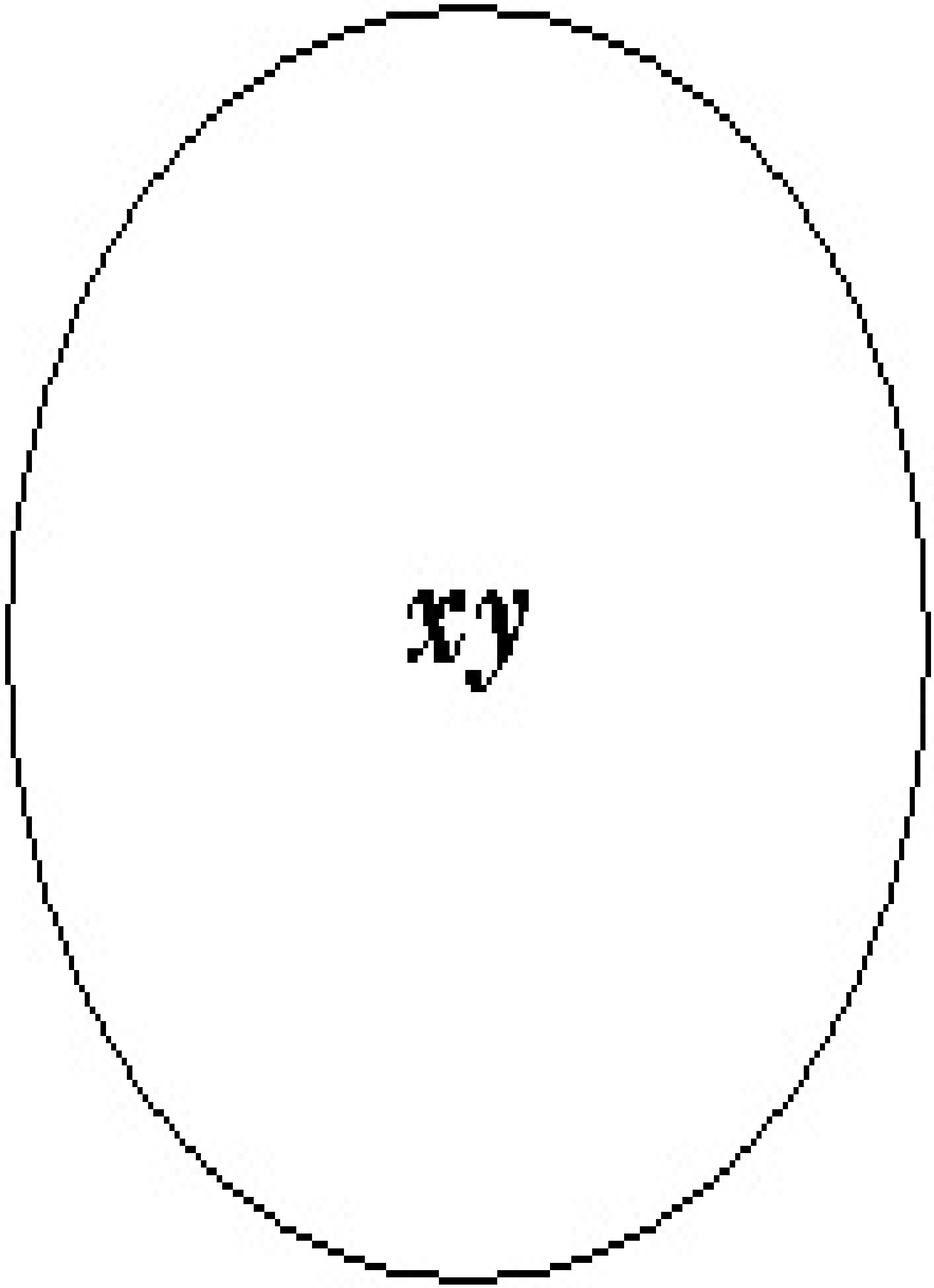

x
y
m

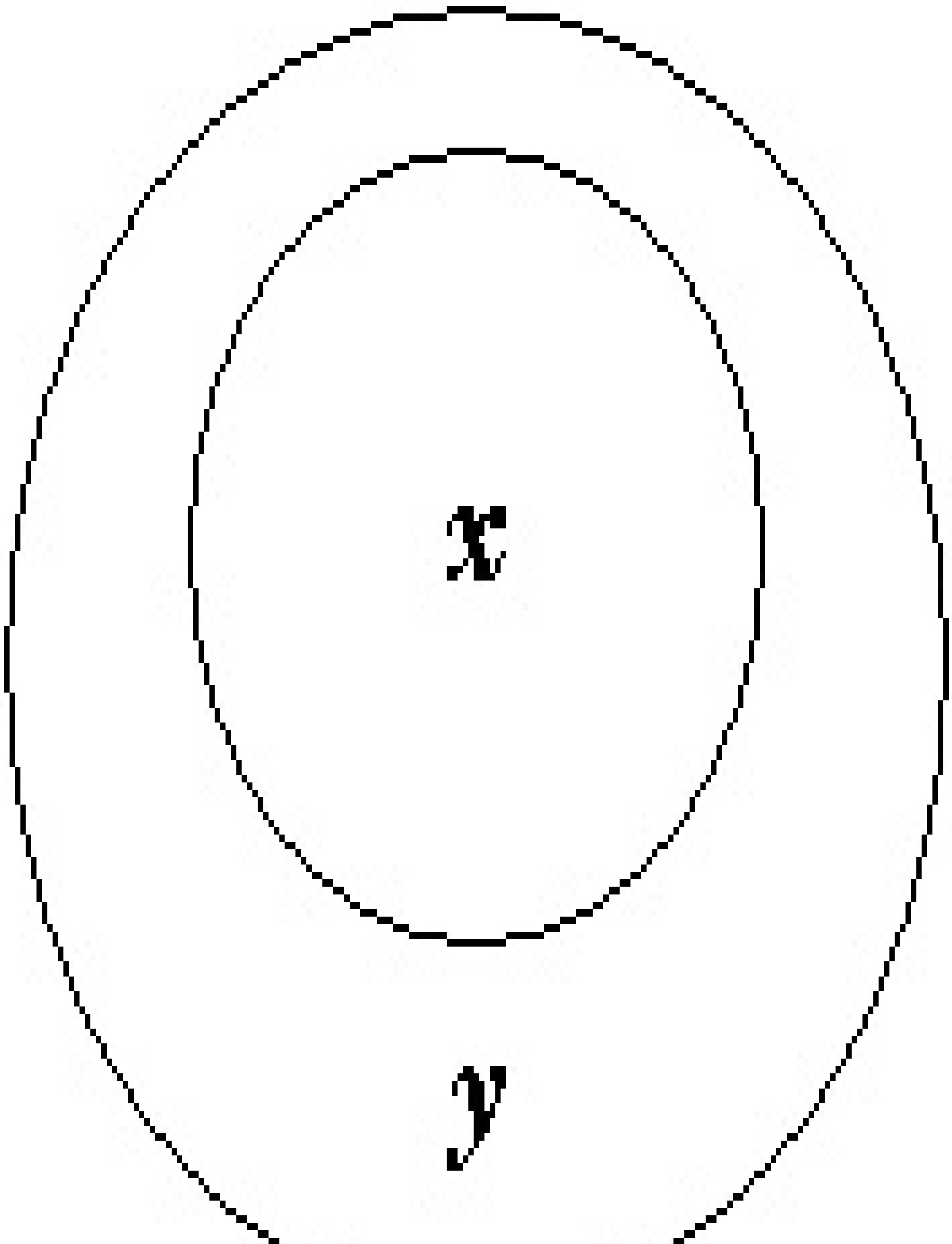
From this group (Figs. 5 to 13) we have, by disregarding m, to find the relation of x and y. On examination we find that Figs. 5, 10, 13 express the relation of entire mutual exclusion; that Figs. 6, 11 express partial inclusion and partial exclusion; that Fig. 7 expresses coincidence; that Figs. 8, 12 express entire inclusion of x in y; and that Fig. 9 expresses entire inclusion of y in x.

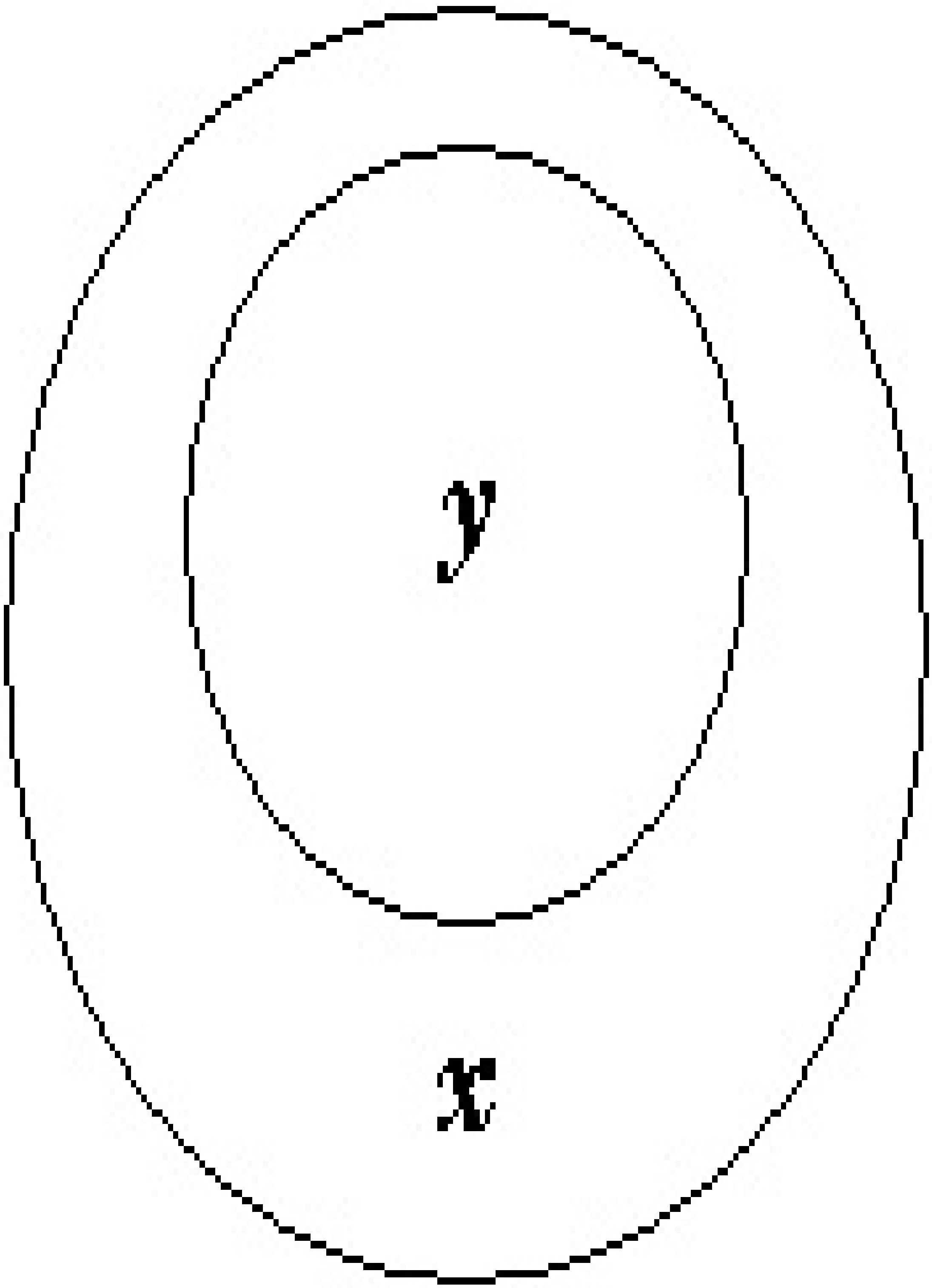
We thus get five Biliteral Diagrams for x and y, viz.


x
y


x
y


xy


x
y

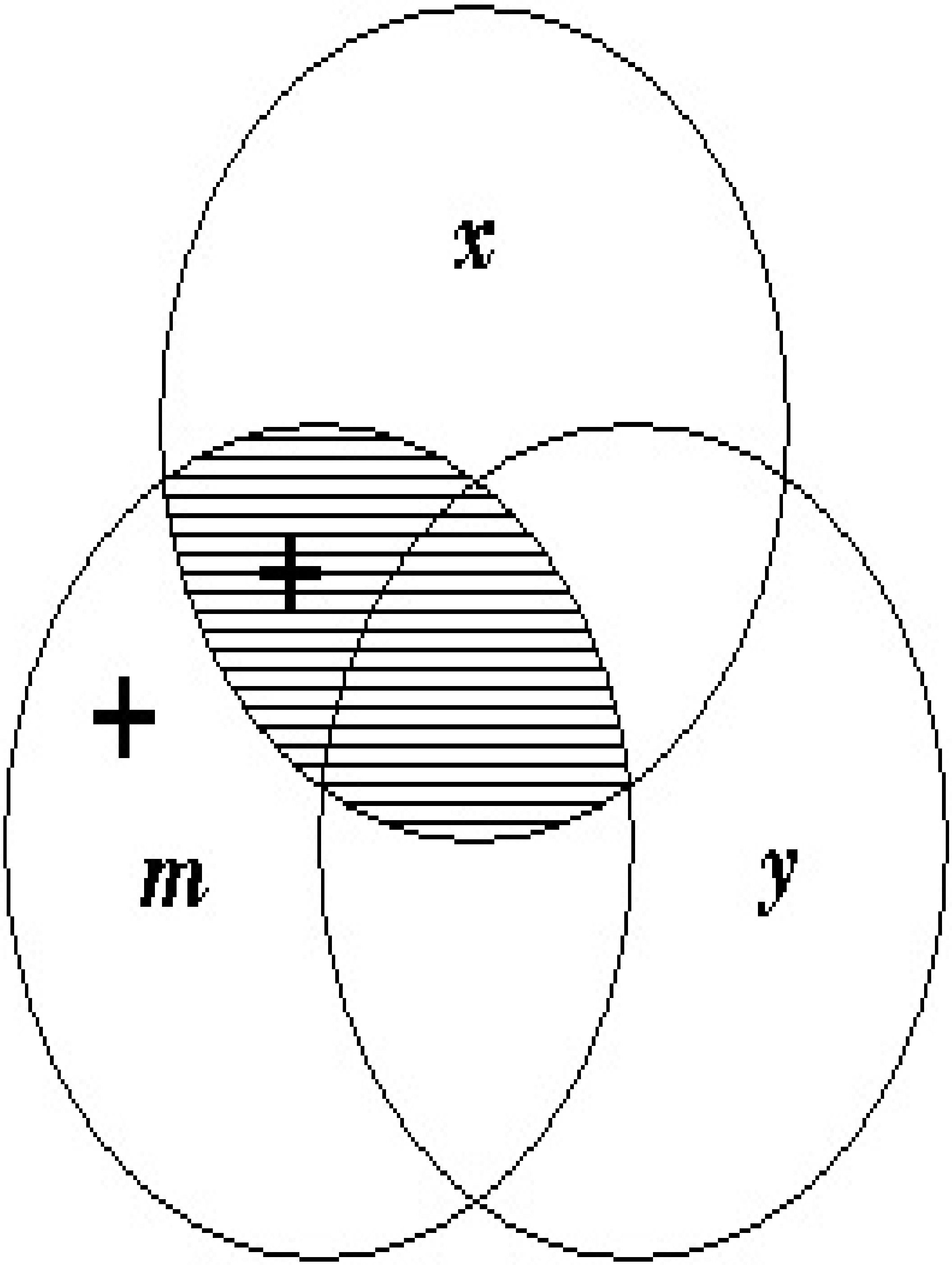

y
x

where the only Proposition, represented by them all, is “Some not-y are not-x,” i.e. “Some persons, who are not gamblers, are not philosophers”——a result which Euler would hardly have regarded as a valuable one, since he seems to have assumed that a Proposition of this form is always true!

(4) Solution by Venn’s Method of Diagrams.

The following Solution has been kindly supplied to me Mr. Venn himself.

”The Minor Premiss declares that some of the constituents in my′ must be saved: mark these constituents with a cross.


x
m
y

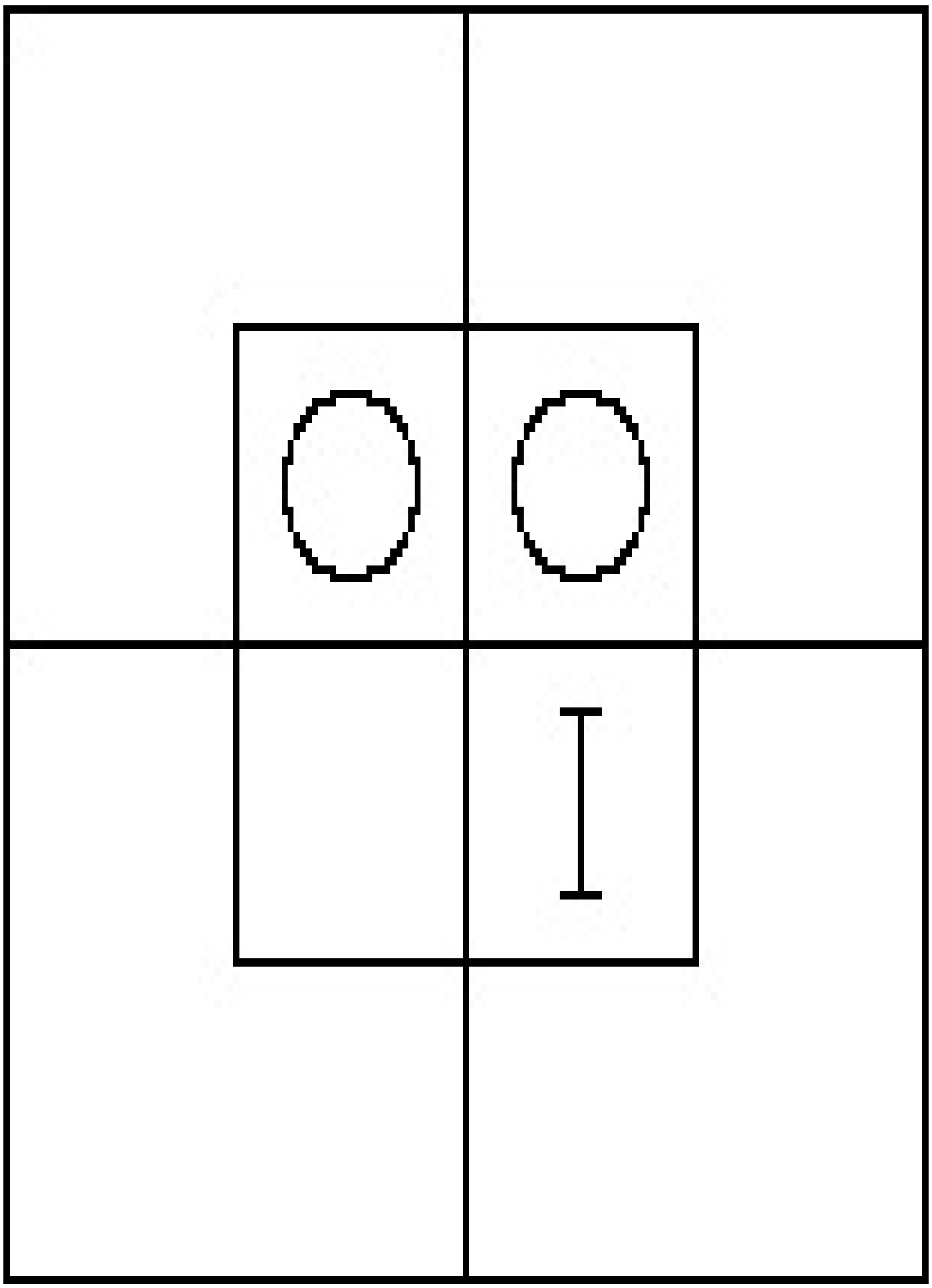
The Major declares that all xm must be destroyed; erase it.

Then, as some my′ is to be saved, it must clearly be my′x′. That is, there must exist my′x′; or eliminating m, y′x′. In common phraseology, ‘Some y′ are x′,’ or, ‘Some not-gamblers are not-philosophers.’”

(5) Solution by my Method of Diagrams.

The first Premiss asserts that no xm exist: so we mark the xm-Compartment as empty, by placing a ‘O’ in each of its Cells.

The second asserts that some my′ exist: so we mark the my′-Compartment as occupied, by placing a ‘I’ in its only available Cell.



The only information, that this gives us as to x and y, is that the x′y′-Compartment is occupied, i.e. that some x′y′ exist.

Hence “Some x′ are y′”: i.e. “Some persons, who are not philosophers, are not gamblers”.

(6) Solution by my Method of Subscripts.

$$xm0 \dagger my'1 \P x'y'1$$

i.e. “Some persons, who are not philosophers, are not gamblers.”

§ 9.

My Method of treating Syllogisms and Sorites.

Of all the strange things, that are to be met with in the ordinary text-books of Formal Logic, perhaps the strangest is the violent contrast one finds to exist between their ways of dealing with these two subjects. While they have elaborately discussed no less than nineteen different forms of Syllogisms——each with its own special and exasperating Rules, while the whole constitute an almost useless machine, for practical purposes, many of the Conclusions being incomplete, and many quite legitimate forms being ignored——they have limited Sorites to two forms only, of childish simplicity; and these they have dignified with special names, apparently under the impression that no other possible forms existed!

As to Syllogisms, I find that their nineteen forms, with about a score of others

which they have ignored, can all be arranged under three forms, each with a very simple Rule of its own; and the only question the Reader has to settle, in working any one of the 101 Examples given at p. 101 of this book, is “Does it belong to Fig. I., II., or III.?”

As to Sorites, the only two forms, recognised by the text-books, are the Aristotelian, whose Premisses are a series of Propositions in A, so arranged that the Predicate of each is the Subject of the next, and the Goclenian, whose Premisses are the very same series, written backwards. Goclenius, it seems, was the first who noticed the startling fact that it does not affect the force of a Syllogism to invert the order of its Premisses, and who applied this discovery to a Sorites. If we assume (as surely we may?) that he is the same man as that transcendent genius who first noticed that 4 times 5 is the same thing as 5 times 4, we may apply to him what somebody (Edmund Yates, I think it was) has said of Tupper, viz., “here is a man who, beyond all others of his generation, has been favoured with Glimpses of the Obvious!”

These puerile——not to say infantine——forms of a Sorites I have, in this book, ignored from the very first, and have not only admitted freely Propositions in E, but have purposely stated the Premisses in random order, leaving to the Reader the useful task of arranging them, for himself, in an order which can be worked as a series of regular Syllogisms. In doing this, he can begin with any one of them he likes.

I have tabulated, for curiosity, the various orders in which the Premisses of the Aristotelian Sorites

1. All a are b;

2. All b are c;

3. All c are d;

4. All d are e;

5. All e are h.

∴ All a are h.

may be syllogistically arranged, and I find there are no less than sixteen such orders, viz., 12345, 21345, 23145, 23415, 23451, 32145, 32415, 32451, 34215, 34251, 34521, 43215, 43251, 43521, 45321, 54321. Of these the first and the last have been dignified with names; but the other fourteen——first enumerated by an obscure Writer on Logic, towards the end of the Nineteenth Century——remain without a name!

§ 10.

Some account of Parts II, III.

In Part II. will be found some of the matters mentioned in this Appendix, viz., the "Existential Import" of Propositions, the use of a negative Copula, and the theory that "two negative Premisses prove nothing." I shall also extend the range of Syllogisms, by introducing Propositions containing alternatives (such as "Not-all x are y"), Propositions containing 3 or more Terms (such as "All ab are c", which, taken along with "Some bc′ are d", would prove "Some d are a′"), &c. I shall also discuss Sorites containing Entities, and the very puzzling subjects of Hypotheticals and Dilemmas. I hope, in the course of Part II., to go over all the ground usually traversed in the text-books used in our Schools and Universities, and to enable my Readers to solve Problems of the same kind as, and far harder than, those that are at present set in their Examinations.

In Part III. I hope to deal with many curious and out-of-the-way subjects, some of which are not even alluded to in any of the treatises I have met with. In this Part will be found such matters as the Analysis of Propositions into their Elements (let the Reader, who has never gone into this branch of the subject, try to make out for himself what additional Proposition would be needed to convert "Some a are b" into "Some a are bc"), the treatment of Numerical and Geometrical Problems, the construction of Problems, and the solution of Syllogisms and Sorites containing Propositions more complex than any that I have used in Part II.

I will conclude with eight Problems, as a taste of what is coming in Part II. I shall be very glad to receive, from any Reader, who thinks he has solved any one of them (more especially if he has done so without using any Method of Symbols), what he conceives to be its complete Conclusion.

It may be well to explain what I mean by the complete Conclusion of a Syllogism or a Sorites. I distinguish their Terms as being of two kinds——those which can be eliminated (e.g. the Middle Term of a Syllogism), which I call the “Eliminands,” and those which cannot, which I call the “Retinends”; and I do not call the Conclusion complete, unless it states all the relations among the Retinends only, which can be deduced from the Premisses.

1.

All the boys, in a certain School, sit together in one large room every evening. They are of no less than five nationalities——English, Scotch, Welsh, Irish, and German. One of the Monitors (who is a great reader of Wilkie Collins’ novels) is very observant, and takes MS. notes of almost everything that happens, with the view of being a good sensational witness, in case any conspiracy to commit a murder should be on foot. The following are some of his notes:—

(1) Whenever some of the English boys are singing “Rule Britannia”, and some not, some of the Monitors are wide-awake;

(2) Whenever some of the Scotch are dancing reels, and some of the Irish fighting, some of the Welsh are eating toasted cheese;

(3) Whenever all the Germans are playing chess, some of the Eleven are not oiling their bats;

(4) Whenever some of the Monitors are asleep, and some not, some of the Irish are fighting;

(5) Whenever some of the Germans are playing chess, and none of the Scotch are dancing reels, some of the Welsh are not eating toasted cheese;

(6) Whenever some of the Scotch are not dancing reels, and some of the Irish not fighting, some of the Germans are playing chess;

(7) Whenever some of the Monitors are awake, and some of the Welsh are eating toasted cheese, none of the Scotch are dancing reels;

(8) Whenever some of the Germans are not playing chess, and some of the Welsh are not eating toasted cheese, none of the Irish are fighting;

(9) Whenever all the English are singing “Rule Britannia,” and some of the Scotch are not dancing reels, none of the Germans are playing chess;

10) Whenever some of the English are singing “Rule Britannia”, and some of the Monitors are asleep, some of the Irish are not fighting;

(11) Whenever some of the Monitors are awake, and some of the Eleven are not oiling their bats, some of the Scotch are dancing reels;

(12) Whenever some of the English are singing “Rule Britannia”, and some of the Scotch are not dancing reels,

Here the MS. breaks off suddenly. The Problem is to complete the sentence, if possible.

[N.B. In solving this Problem, it is necessary to remember that the Proposition “All x are y” is a Double Proposition, and is equivalent to “Some x are y, and none are y′.” See p. 17.]

2.

(1) A logician, who eats pork-chops for supper, will probably lose money;

(2) A gambler, whose appetite is not ravenous, will probably lose money;

(3) A man who is depressed, having lost money and being likely to lose more, always rises at 5 a.m.;

(4) A man, who neither gambles nor eats pork-chops for supper, is sure to have a ravenous appetite;

(5) A lively man, who goes to bed before 4 a.m., had better take to cab-driving;

(6) A man with a ravenous appetite, who has not lost money and does not rise at 5 a.m., always eats pork-chops for supper;

(7) A logician, who is in danger of losing money, had better take to cab-driving;

(8) An earnest gambler, who is depressed though he has not lost money, is in no danger of losing any;

(9) A man, who does not gamble, and whose appetite is not ravenous, is always lively;

(10) A lively logician, who is really in earnest, is in no danger of losing money;

(11) A man with a ravenous appetite has no need to take to cab-driving, if he is really in earnest;

(12) A gambler, who is depressed though in no danger of losing money, sits up till 4 a.m.

(13) A man, who has lost money and does not eat pork-chops for supper, had better take to cab-driving, unless he gets up at 5 a.m.

(14) A gambler, who goes to bed before 4 a.m., need not take to cab-driving, unless he has a ravenous appetite;

(15) A man with a ravenous appetite, who is depressed though in no danger of losing, is a gambler.

Univ. "men"; a = earnest; b = eating pork-chops for supper; c = gamblers; d = getting up at 5; e = having lost money; h = having a ravenous appetite; k = likely to lose money; l = lively; m = logicians; n = men who had better take to cab-driving; r = sitting up till 4.

[N.B. In this Problem, clauses, beginning with "though", are intended to be treated as essential parts of the Propositions in which they occur, just as if they had begun with "and".]

3.

(1) When the day is fine, I tell Froggy “You’re quite the dandy, old chap!”;

(2) Whenever I let Froggy forget that £10 he owes me, and he begins to strut about like a peacock, his mother declares “He shall not go out a-wooing!”;

(3) Now that Froggy’s hair is out of curl, he has put away his gorgeous waistcoat;

(4) Whenever I go out on the roof to enjoy a quiet cigar, I’m sure to discover that my purse is empty;

(5) When my tailor calls with his little bill, and I remind Froggy of that £10 he owes me, he does not grin like a hyæna;

(6) When it is very hot, the thermometer is high;

(7) When the day is fine, and I’m not in the humour for a cigar, and Froggy is grinning like a hyæna, I never venture to hint that he’s quite the dandy;

(8) When my tailor calls with his little bill and finds me with an empty purse, I remind Froggy of that £10 he owes me;

(9) My railway-shares are going up like anything!

(10) When my purse is empty, and when, noticing that Froggy has got his gorgeous waistcoat on, I venture to remind him of that £10 he owes me, things are apt to get rather warm;

(11) Now that it looks like rain, and Froggy is grinning like a hyæna, I can do without my cigar;

(12) When the thermometer is high, you need not trouble yourself to take an umbrella;

(13) When Froggy has his gorgeous waistcoat on, but is not strutting about like a

peacock, I betake myself to a quiet cigar;

(14) When I tell Froggy that he’s quite the dandy, he grins like a hyæna;

(15) When my purse is tolerably full, and Froggy’s hair is one mass of curls, and when he is not strutting about like a peacock, I go out on the roof;

(16) When my railway-shares are going up, and when it is chilly and looks like rain, I have a quiet cigar;

(17) When Froggy’s mother lets him go a-wooing, he seems nearly mad with joy, and puts on a waistcoat that is gorgeous beyond words;

(18) When it is going to rain, and I am having a quiet cigar, and Froggy is not intending to go a-wooing, you had better take an umbrella;

(19) When my railway-shares are going up, and Froggy seems nearly mad with joy, that is the time my tailor always chooses for calling with his little bill;

(20) When the day is cool and the thermometer low, and I say nothing to Froggy about his being quite the dandy, and there’s not the ghost of a grin on his face, I haven’t the heart for my cigar!

4.

(1) Any one, fit to be an M.P., who is not always speaking, is a public benefactor;

(2) Clear-headed people, who express themselves well, have had a good education;

(3) A woman, who deserves praise, is one who can keep a secret;

(4) People, who benefit the public, but do not use their influence for good purpose, are not fit to go into Parliament;

(5) People, who are worth their weight in gold and who deserve praise, are

always unassuming;

(6) Public benefactors, who use their influence for good objects, deserve praise;

(7) People, who are unpopular and not worth their weight in gold, never can keep a secret;

(8) People, who can talk for ever and are fit to be Members of Parliament, deserve praise;

(9) Any one, who can keep a secret and who is unassuming, is a never-to-be-forgotten public benefactor;

(10) A woman, who benefits the public, is always popular;

(11) People, who are worth their weight in gold, who never leave off talking, and whom it is impossible to forget, are just the people whose photographs are in all the shop-windows;

(12) An ill-educated woman, who is not clear-headed, is not fit to go into Parliament;

(13) Any one, who can keep a secret and is not for ever talking, is sure to be unpopular;

(14) A clear-headed person, who has influence and uses it for good objects, is a public benefactor;

(15) A public benefactor, who is unassuming, is not the sort of person whose photograph is in every shop-window;

(16) People, who can keep a secret and who use their influence for good purposes, are worth their weight in gold;

(17) A person, who has no power of expression and who cannot influence others, is certainly not a woman;

(18) People, who are popular and worthy of praise, either are public benefactors or else are unassuming.

Univ. “persons”; a = able to keep a secret; b = clear-headed; c = constantly talking; d = deserving praise; e = exhibited in shop-windows; h = expressing oneself well; k = fit to be an M.P.; l = influential; m = never-to-be-forgotten; n = popular; r = public benefactors; s = unassuming; t = using one’s influence for good objects; v = well-educated; w = women; z = worth one’s weight in gold.

5.

Six friends, and their six wives, are staying in the same hotel; and they all walk out daily, in parties of various size and composition. To ensure variety in these daily walks, they have agree to observe the following Rules:—

(1) If Acres is with (i.e. is in the same party with) his wife, and Barry with his, and Eden with Mrs. Hall, Cole must be with Mrs. Dix;

(2) If Acres is with his wife, and Hall with his, and Barry with Mrs. Cole, Dix must not be with Mrs. Eden;

(3) If Cole and Dix and their wives are all in the same party, and Acres not with Mrs. Barry, Eden must not be with Mrs. Hall;

(4) If Acres is with his wife, and Dix with his, and Barry not with Mrs. Cole, Eden must be with Mrs. Hall;

(5) If Eden is with his wife, and Hall with his, and Cole with Mrs. Dix, Acres must not be with Mrs. Barry;

(6) If Barry and Cole and their wives are all in the same party, and Eden not with Mrs. Hall, Dix must be with Mrs. Eden.

The Problem is to prove that there must be, every day, at least one married couple who are not in the same party.

6.

After the six friends, named in Problem 5, had returned from their tour, three of them, Barry, Cole, and Dix, agreed, with two other friends of theirs, Lang and Mill, that the five should meet, every day, at a certain table d’hôte. Remembering how much amusement they had derived from their code of rules for walking-parties, they devised the following rules to be observed whenever beef appeared on the table:—

(1) If Barry takes salt, then either Cole or Lang takes one only of the two condiments, salt and mustard: if he takes mustard, then either Dix takes neither condiment, or Mill takes both.

(2) If Cole takes salt, then either Barry takes only one condiment, or Mill takes neither: if he takes mustard, then either Dix or Lang takes both.

(3) If Dix takes salt, then either Barry takes neither condiment or Cole take both: if he takes mustard, then either Lang or Mill takes neither.

(4) If Lang takes salt, then Barry or Dix takes only one condiment: if he takes mustard, then either Cole or Mill takes neither.

(5) If Mill takes salt, then either Barry or Lang takes both condiments: if he takes mustard, then either Cole or Dix takes only one.

The Problem is to discover whether these rules are compatible; and, if so, what arrangements are possible.

[N.B. In this Problem, it is assumed that the phrase “if Barry takes salt” allows of two possible cases, viz. (1) “he takes salt only”; (2) “he takes both condiments”. And so with all similar phrases.

It is also assumed that the phrase “either Cole or Lang takes one only of the two condiments” allows three possible cases, viz. (1) “Cole takes one only, Lang takes both or neither”; (2) “Cole takes both or neither, Lang takes one only”; (3) “Cole takes one only, Lang takes one only”. And so with all similar phrases.

It is also assumed that every rule is to be understood as implying the words “and

vice versâ." Thus the first rule would imply the addition "and, if either Cole or Lang takes only one condiment, then Barry takes salt."]

7.

(1) Brothers, who are much admired, are apt to be self-conscious;

(2) When two men of the same height are on opposite sides in Politics, if one of them has his admirers, so also has the other;

(3) Brothers, who avoid general Society, look well when walking together;

(4) Whenever you find two men, who differ in Politics and in their views of Society, and who are not both of them ugly, you may be sure that they look well when walking together;

(5) Ugly men, who look well when walking together, are not both of them free from self-consciousness;

(6) Brothers, who differs in Politics, and are not both of them handsome, never give themselves airs;

(7) John declines to go into Society, but never gives himself airs;

(8) Brothers, who are apt to be self-conscious, though not both of them handsome, usually dislike Society;

(9) Men of the same height, who do not give themselves airs, are free from self-consciousness;

(10) Men, who agree on questions of Art, though they differ in Politics, and who are not both of them ugly, are always admired;

(11) Men, who hold opposite views about Art and are not admired, always give themselves airs;

(12) Brothers of the same height always differ in Politics;

(13) Two handsome men, who are neither both of them admired nor both of them self-conscious, are no doubt of different heights;

(14) Brothers, who are self-conscious, and do not both of them like Society, never look well when walking together.

[N.B. See Note at end of Problem 2.]

8.

(1) A man can always master his father;

(2) An inferior of a man's uncle owes that man money;

(3) The father of an enemy of a friend of a man owes that man nothing;

(4) A man is always persecuted by his son's creditors;

(5) An inferior of the master of a man's son is senior to that man;

(6) A grandson of a man's junior is not his nephew;

(7) A servant of an inferior of a friend of a man's enemy is never persecuted by that man;

(8) A friend of a superior of the master of a man's victim is that man's enemy;

(9) An enemy of a persecutor of a servant of a man's father is that man's friend.

The Problem is to deduce some fact about great-grandsons.

[N.B. In this Problem, it is assumed that all the men, here referred to, live in the same town, and that every pair of them are either "friends" or "enemies," that

every pair are related as “senior and junior”, “superior and inferior”, and that certain pairs are related as “creditor and debtor”, “father and son”, “master and servant”, “persecutor and victim”, “uncle and nephew”.]

9.

“Jack Sprat could eat no fat:

His wife could eat no lean:

And so, between them both,

They licked the platter clean.”

Solve this as a Sorites-Problem, taking lines 3 and 4 as the Conclusion to be proved. It is permitted to use, as Premisses, not only all that is here asserted, but also all that we may reasonably understand to be implied.

NOTES TO APPENDIX.

(A) [See p. 167, line 6.]

It may, perhaps, occur to the Reader, who has studied Formal Logic that the argument, here applied to the Propositions I and E, will apply equally well to the Propositions I and A (since, in the ordinary text-books, the Propositions "All xy are z" and "Some xy are not z" are regarded as Contradictories). Hence it may appear to him that the argument might have been put as follows:—

"We now have I and A 'asserting.' Hence, if the Proposition 'All xy are z' be true, some things exist with the Attributes x and y: i.e. 'Some x are y.'

"Also we know that, if the Proposition 'Some xy are not-z' be true the same result follows.

"But these two Propositions are Contradictories, so that one or other of them must be true. Hence this result is always true: i.e. the Proposition 'Some x are y' is always true!

"Quod est absurdum. Hence I cannot assert."

This matter will be discussed in Part II; but I may as well give here what seems to me to be an irresistable proof that this view (that A and I are Contradictories), though adopted in the ordinary text-books, is untenable. The proof is as follows:—

With regard to the relationship existing between the Class 'xy' and the two Classes 'z' and 'not-z', there are four conceivable states of things, viz.

(1)	Some xy	are z,	and	some	are not-z;
(2)				none	
(3)	No xy			some	
(4)				none	

Of these four, No. (2) is equivalent to “All xy are z”, No. (3) is equivalent to “All xy are not-z”, and No. (4) is equivalent to “No xy exist.”

Now it is quite undeniable that, of these four states of things, each is, a priori, possible, some one must be true, and the other three must be false.

Hence the Contradictory to (2) is “Either (1) or (3) or (4) is true.” Now the assertion “Either (1) or (3) is true” is equivalent to “Some xy are not-z”; and the assertion “(4) is true” is equivalent to “No xy exist.” Hence the Contradictory to “All xy are z” may be expressed as the Alternative Proposition “Either some xy are not-z, or no xy exist,” but not as the Categorical Proposition “Some y are not-z.”

(B) [See p. 171, at end of Section 2.]

There are yet other views current among “The Logicians”, as to the “Existential Import” of Propositions, which have not been mentioned in this Section.

One is, that the Proposition “some x are y” is to be interpreted, neither as “Some x exist and are y”, nor yet as “If there were any x in existence, some of them would be y”, but merely as “Some x can be y; i.e. the Attributes x and y are compatible”. On this theory, there would be nothing offensive in my telling my friend Jones “Some of your brothers are swindlers”; since, if he indignantly retorted “What do you mean by such insulting language, you scoundrel?”, I should calmly reply “I merely mean that the thing is conceivable——that some of your brothers might possibly be swindlers”. But it may well be doubted whether such an explanation would entirely appease the wrath of Jones!

Another view is, that the Proposition “All x are y” sometimes implies the actual existence of x, and sometimes does not imply it; and that we cannot tell, without having it in concrete form, which interpretation we are to give to it. This view is, I think, strongly supported by common usage; and it will be fully discussed in Part II: but the difficulties, which it introduces, seem to me too formidable to be even alluded to in Part I, which I am trying to make, as far as possible, easily

intelligible to mere beginners.

(C) [See p. 173, § 4.]

The three Conclusions are

"No conceited child of mine is greedy";

"None of my boys could solve this problem";

"Some unlearned boys are not choristers."

THE GAME OF LOGIC

By Lewis Carroll

Main TOC

Contents


```
 ---------------------
 |9       |        10|
 |        |          |
 |    -----x------    |
 |  |11  |    12|    |
 |  |    |      |    |
 |---y-----m------y'---|
```

```
| |   |     |   |
| |13  |    14|    |
|    -----x'-----    |
|        |          |
|15      |        16|
---------------------
  COLOURS FOR              -------------
    COUNTERS             |5    |    6|
        ___              |     x     |
                        |     |     |
See the Sun is overhead,  |--y-------y'-|
Shining on us, FULL and    |     |     |
        RED!              |     x'    |
                        |7    |    8|
Now the Sun is gone away,  -------------
And the EMPTY sky is
        GREY!
        ___
```

To my Child-friend.

I charm in vain; for never again,
All keenly as my glance I bend,
Will Memory, goddess coy,
Embody for my joy
Departed days, nor let me gaze
On thee, my fairy friend!

Yet could thy face, in mystic grace,
A moment smile on me, ‘twould send
Far-darting rays of light
From Heaven athwart the night,
By which to read in very deed
Thy spirit, sweetest friend!

So may the stream of Life’s long dream
Flow gently onward to its end,
With many a floweret gay,
Adown its willowy way:

May no sigh vex, no care perplex,

My loving little friend!

PREFACE

Table of Contents

"There foam'd rebellious Logic, gagg'd and bound."

This Game requires nine Counters—four of one colour and five of another: say four red and five grey.

Besides the nine Counters, it also requires one Player, AT LEAST. I am not aware of any Game that can be played with LESS than this number: while there are several that require MORE: take Cricket, for instance, which requires twenty-two. How much easier it is, when you want to play a Game, to find ONE Player than twenty-two. At the same time, though one Player is enough, a good deal more amusement may be got by two working at it together, and correcting each other's mistakes.

A second advantage, possessed by this Game, is that, besides being an endless source of amusement (the number of arguments, that may be worked by it, being infinite), it will give the Players a little instruction as well. But is there any great harm in THAT, so long as you get plenty of amusement?

CHAPTER I.

NEW LAMPS FOR OLD.

Table of Contents

"Light come, light go."

---

1. Propositions.

"Some new Cakes are nice."

"No new Cakes are nice."

"All new cakes are nice."

There are three ‘PROPOSITIONS’ for you—the only three kinds we are going to use in this Game: and the first thing to be done is to learn how to express them on the Board.

Let us begin with

“Some new Cakes are nice.”

But before doing so, a remark has to be made—one that is rather important, and by no means easy to understand all in a moment: so please to read this VERY carefully.

The world contains many THINGS (such as “Buns”, “Babies”, “Beetles”.

“Battledores”. &c.); and these Things possess many ATTRIBUTES (such as “baked”, “beautiful”, “black”, “broken”, &c.: in fact, whatever can be “attributed to”, that is “said to belong to”, any Thing, is an Attribute). Whenever we wish to mention a Thing, we use a SUBSTANTIVE: when we wish to mention an Attribute, we use an ADJECTIVE. People have asked the question “Can a Thing exist without any Attributes belonging to it?” It is a very puzzling question, and I’m not going to try to answer it: let us turn up our noses, and treat it with contemptuous silence, as if it really wasn’t worth noticing. But, if they put it the other way, and ask “Can an Attribute exist without any Thing for it to belong to?”, we may say at once “No: no more than a Baby could go a railway-journey with no one to take care of it!” You never saw “beautiful” floating about in the air, or littered about on the floor, without any Thing to BE beautiful, now did you?

And now what am I driving at, in all this long rigmarole? It is this. You may put “is” or “are” between names of two THINGS (for example, “some Pigs are fat Animals”), or between the names of two ATTRIBUTES (for example, “pink is light-red”), and in each case it will make good sense. But, if you put “is” or “are” between the name of a THING and the name of an ATTRIBUTE (for example, “some Pigs are pink”), you do NOT make good sense (for how can a Thing BE an Attribute?) unless you have an understanding with the person to whom you are speaking. And the simplest understanding would, I think, be this—that the Substantive shall be supposed to be repeated at the end of the sentence, so that the sentence, if written out in full, would be “some Pigs are pink (Pigs)”. And now the word “are” makes quite good sense.

Thus, in order to make good sense of the Proposition “some new Cakes are nice”, we must suppose it to be written out in full, in the form “some new Cakes are nice (Cakes)”. Now this contains two ‘TERMS’—“new Cakes” being one of them, and “nice (Cakes)” the other. “New Cakes,” being the one we are talking about, is called the ‘SUBJECT’ of the Proposition, and “nice (Cakes)” the ‘PREDICATE’. Also this Proposition is said to be a ‘PARTICULAR’ one, since it does not speak of the WHOLE of its Subject, but only of a PART of it. The other two kinds are said to be ‘UNIVERSAL’, because they speak of the WHOLE of their Subjects—the one denying niceness, and the other asserting it, of the WHOLE class of “new Cakes”. Lastly, if you would like to have a definition of the word ‘PROPOSITION’ itself, you may take this:—“a sentence stating that some, or none, or all, of the Things belonging to a certain class, called its ‘Subject’, are also Things belonging to a certain other class, called its

‘Predicate’”.

You will find these seven words—PROPOSITION, ATTRIBUTE, TERM, SUBJECT, PREDICATE, PARTICULAR, UNIVERSAL—charmingly useful, if any friend should happen to ask if you have ever studied Logic. Mind you bring all seven words into your answer, and you friend will go away deeply impressed—‘a sadder and a wiser man’.

Now please to look at the smaller Diagram on the Board, and suppose it to be a cupboard, intended for all the Cakes in the world (it would have to be a good large one, of course). And let us suppose all the new ones to be put into the upper half (marked ‘x’), and all the rest (that is, the NOT-new ones) into the lower half (marked ‘x”). Thus the lower half would contain ELDERLY Cakes, AGED Cakes, ANTE-DILUVIAN Cakes—if there are any: I haven’t seen many, myself—and so on. Let us also suppose all the nice Cakes to be put into the left-hand half (marked ‘y’), and all the rest (that is, the not-nice ones) into the right-hand half (marked ‘y”). At present, then, we must understand x to mean “new”, x’ “not-new”, y “nice”, and y’ “not-nice.”

And now what kind of Cakes would you expect to find in compartment No. 5?

It is part of the upper half, you see; so that, if it has any Cakes in it, they must be NEW: and it is part of the left-hand half; so that they must be NICE. Hence if there are any Cakes in this compartment, they must have the double ‘ATTRIBUTE’ “new and nice”: or, if we use letters, the must be “x y.”

Observe that the letters x, y are written on two of the edges of this compartment. This you will find a very convenient rule for knowing what Attributes belong to the Things in any compartment. Take No. 7, for instance. If there are any Cakes there, they must be “x’ y”, that is, they must be “not-new and nice.”

Now let us make another agreement—that a red counter in a compartment shall mean that it is ‘OCCUPIED’, that is, that there are SOME Cakes in it. (The word ‘some,’ in Logic, means ‘one or more’ so that a single Cake in a compartment would be quite enough reason for saying “there are SOME Cakes here”). Also let us agree that a grey counter in a compartment shall mean that it is ‘EMPTY’, that is that there are NO Cakes in it. In the following Diagrams, I shall put ‘1’ (meaning ‘one or more’) where you are to put a RED counter, and ‘0’ (meaning ‘none’) where you are to put a GREY one.

As the Subject of our Proposition is to be “new Cakes”, we are only concerned, at present, with the UPPER half of the cupboard, where all the Cakes have the attribute x, that is, “new.”

Now, fixing our attention on this upper half, suppose we found it marked like this,

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   -----------

 |   |   |

 | 1 |   |

 |   |   |

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that is, with a red counter in No. 5. What would this tell us, with regard to the class of “new Cakes”?

Would it not tell us that there are SOME of them in the x y-compartment? That is, that some of them (besides having the Attribute x, which belongs to both compartments) have the Attribute y (that is, “nice”). This we might express by saying “some x-Cakes are y-(Cakes)”, or, putting words instead of letters,

“Some new Cakes are nice (Cakes)”,

or, in a shorter form,

“Some new Cakes are nice”.

At last we have found out how to represent the first Proposition of this Section. If you have not CLEARLY understood all I have said, go no further, but read it

over and over again, till you DO understand it. After that is once mastered, you will find all the rest quite easy.

It will save a little trouble, in doing the other Propositions, if we agree to leave out the word “Cakes” altogether. I find it convenient to call the whole class of Things, for which the cupboard is intended, the ‘UNIVERSE.’ Thus we might have begun this business by saying “Let us take a Universe of Cakes.” (Sounds nice, doesn’t it?)

Of course any other Things would have done just as well as Cakes. We might make Propositions about “a Universe of Lizards”, or even “a Universe of Hornets”. (Wouldn’t THAT be a charming Universe to live in?)

So far, then, we have learned that

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|   |   |
| 1 |   |
|   |   |
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```

means “some x and y,” i.e. “some new are nice.”

I think you will see without further explanation, that

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|   |   |
|   | 1 |
|   |   |
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means “some x are y’,” i.e. “some new are not-nice.”

Now let us put a GREY counter into No. 5, and ask ourselves the meaning of

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|   |   |
| 0 |   |
|   |   |
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This tells us that the x y-compartment is EMPTY, which we may express by “no x are y”, or, “no new Cakes are nice”. This is the second of the three Propositions at the head of this Section.

In the same way,

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|   |   |
|   | 0 |
|   |   |
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would mean “no x are y’,” or, “no new Cakes are not-nice.”

What would you make of this, I wonder?

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|   |   |
| 1 | 1 |
|   |   |
 -----------
```

I hope you will not have much trouble in making out that this represents a DOUBLE Proposition: namely, “some x are y, AND some are y’,” i.e. “some new are nice, and some are not-nice.”

The following is a little harder, perhaps:

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 |   |   |

 | 0 | 0 |

 |   |   |

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This means “no x are y, AND none are y’,” i.e. “no new are nice, AND none are not-nice”: which leads to the rather curious result that “no new exist,” i.e. “no Cakes are new.” This is because “nice” and “not-nice” make what we call an ‘EXHAUSTIVE’ division of the class “new Cakes”: i.e. between them, they EXHAUST the whole class, so that all the new Cakes, that exist, must be found in one or the other of them.

And now suppose you had to represent, with counters the contradictory to “no Cakes are new”, which would be “some Cakes are new”, or, putting letters for words, “some Cakes are x”, how would you do it?

This will puzzle you a little, I expect. Evidently you must put a red counter SOMEWHERE in the x-half of the cupboard, since you know there are SOME new Cakes. But you must not put it into the LEFT-HAND compartment, since you do not know them to be NICE: nor may you put it into the RIGHT-HAND one, since you do not know them to be NOT-NICE.

What, then, are you to do? I think the best way out of the difficulty is to place the red counter ON THE DIVISION-LINE between the xy-compartment and the xy’-compartment. This I shall represent (as I always put ‘1’ where you are to put a red counter) by the diagram

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| | |

| -1- |

| | |

Our ingenious American cousins have invented a phrase to express the position of a man who wants to join one or the other of two parties—such as their two parties ‘Democrats’ and ‘Republicans’—but can’t make up his mind WHICH. Such a man is said to be “sitting on the fence.” Now that is exactly the position of the red counter you have just placed on the division-line. He likes the look of No. 5, and he likes the look of No. 6, and he doesn’t know WHICH to jump down into. So there he sits astride, silly fellow, dangling his legs, one on each side of the fence!

Now I am going to give you a much harder one to make out. What does this mean?

| | |

| 1 | 0 |

| | |

This is clearly a DOUBLE Proposition. It tells us not only that “some x are y,” but also the “no x are NOT y.” Hence the result is “ALL x are y,” i.e. “all new Cakes are nice”, which is the last of the three Propositions at the head of this Section.

We see, then, that the Universal Proposition

“All new Cakes are nice”

consists of TWO Propositions taken together, namely,

"Some new Cakes are nice,"

and "No new Cakes are not-nice."

In the same way

```
     -----------
    |   |   |
    | 0 | 1 |
    |   |   |
     -----------
```

would mean “all x are y’ “, that is,

“All new Cakes are not-nice.”

Now what would you make of such a Proposition as “The Cake you have given me is nice”? Is it Particular or Universal?

“Particular, of course,” you readily reply. “One single Cake is hardly worth calling ‘some,’ even.”

No, my dear impulsive Reader, it is ‘Universal’. Remember that, few as they are (and I grant you they couldn’t well be fewer), they are (or rather ‘it is’) ALL that you have given me! Thus, if (leaving ‘red’ out of the question) I divide my Universe of Cakes into two classes—the Cakes you have given me (to which I assign the upper half of the cupboard), and those you HAVEN’T given me (which are to go below)—I find the lower half fairly full, and the upper one as nearly as possible empty. And then, when I am told to put an upright division into each half, keeping the NICE Cakes to the left, and the NOT-NICE ones to the right, I begin by carefully collecting ALL the Cakes you have given me (saying to myself, from time to time, “Generous creature! How shall I ever repay such kindness?”), and piling them up in the left-hand compartment. AND IT DOESN’T TAKE LONG TO DO IT!

Here is another Universal Proposition for you. “Barzillai Beckalegg is an honest man.” That means “ALL the Barzillai Beckaleggs, that I am now considering, are honest men.” (You think I invented that name, now don’t you? But I didn’t. It’s on a carrier’s cart, somewhere down in Cornwall.)

This kind of Universal Proposition (where the Subject is a single Thing) is called an ‘INDIVIDUAL’ Proposition.

Now let us take “NICE Cakes” as the Subject of Proposition: that is, let us fix our thoughts on the LEFT-HAND half of the cupboard, where all the Cakes have attribute y, that is, “nice.”

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                             -----

 Suppose we find it marked like this:--  |   |

                            |  1  |

 What would that tell us?              |   |

                             -----

                            |   |

                            |   |

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I hope that it is not necessary, after explaining the HORIZONTAL oblong so fully, to spend much time over the UPRIGHT one. I hope you will see, for yourself, that this means “some y are x”, that is,

“Some nice Cakes are new.”

“But,” you will say, “we have had this case before. You put a red counter into No. 5, and you told us it meant ‘some new Cakes are nice’; and NOW you tell us that it means ‘some NICE Cakes are NEW’! Can it mean BOTH?”

The question is a very thoughtful one, and does you GREAT credit, dear Reader! It DOES mean both. If you choose to take x (that is, “new Cakes”) as your Subject, and to regard No. 5 as part of a HORIZONTAL oblong, you may read it “some x are y”, that is, “some new Cakes are nice”: but, if you choose to take y (that is, “nice Cake”) as your Subject, and to regard No. 5 as part of an UPRIGHT oblong, THEN you may read it “some y are x”, that is, “some nice Cakes are new”. They are merely two different ways of expressing the very same truth.

Without more words, I will simply set down the other ways in which this upright oblong might be marked, adding the meaning in each case. By comparing them with the various cases of the horizontal oblong, you will, I hope, be able to understand them clearly.

You will find it a good plan to examine yourself on this table, by covering up first one column and then the other, and ‘dodging about’, as the children say.

Also you will do well to write out for yourself two other tables—one for the LOWER half of the cupboard, and the other for its RIGHT-HAND half.

And now I think we have said all we need to say about the smaller Diagram, and may go on to the larger one.

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            |
 Symbols.   |        Meanings.

____________|______________________________
  -----     |
|   |   |
|   |   | Some y are x';
|   |   |   i.e. Some nice are not-new.
  -----     |
|   |   |
| 1 |   |
|   |   |
  -----     |
            |
  -----     |
|   |   | No y are x;
| 0 |   |     i.e. No nice are new.
|   |   |
  -----     | [Observe that this is merely another way of
|   |   |     expressing "No new are nice."]
|   |   |
```

```
|   |   |
  -----     |
            |
  -----     |
|   |   |
|   |   | No y are x';
|   |   |     i.e. No nice are not-new.
  -----     |
|   |   |
| 0 |   |
|   |   |
  -----     |
            |
  -----     |
|   |   |
| 1 |   | Some y are x, and some are x';
|   |   |   i.e. Some nice are new, and some are
  -----     |            not-new.
|   |   |
| 1 |   |
|   |   |
```

```
  -----     |
          |
  -----     |
|    |    |
|  0  |    |  No y are x, and none are x'; i.e. No y
|    |    |     exist;
  -----     |    i.e. No Cakes are nice.
|    |    |
|  0  |    |
|    |    |
  -----     |
          |
  -----     |
|    |    |
|  1  |    |  All y are x;
|    |    |     i.e. All nice are new.
  -----     |
|    |    |
|  0  |    |
|    |    |
  -----     |
```

```
             |
    -----     |
  |   |   |
  | 0 |   | All y are x';
  |   |   |    i.e. All nice are not-new.
    -----     |
  |   |   |
  | 1 |   |
  |   |   |
    -----     |
________________|__________________________________
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This may be taken to be a cupboard divided in the same way as the last, but ALSO divided into two portions, for the Attribute m. Let us give to m the meaning “wholesome”: and let us suppose that all WHOLESOME Cakes are placed INSIDE the central Square, and all the UNWHOLESOME ones OUTSIDE it, that is, in one or other of the four queer-shaped OUTER compartments.

We see that, just as, in the smaller Diagram, the Cakes in each compartment had TWO Attributes, so, here, the Cakes in each compartment have THREE Attributes: and, just as the letters, representing the TWO Attributes, were written on the EDGES of the compartment, so, here, they are written at the CORNERS. (Observe that m’ is supposed to be written at each of the four outer corners.) So that we can tell in a moment, by looking at a compartment, what three Attributes belong to the Things in it. For instance, take No. 12. Here we find x, y’, m, at the corners: so we know that the Cakes in it, if there are any, have the triple Attribute, ‘xy’m’, that is, “new, not-nice, and wholesome.” Again, take No. 16.

Here we find, at the corners, x’, y’, m’: so the Cakes in it are “not-new, not-nice, and unwholesome.” (Remarkably untempting Cakes!)

It would take far too long to go through all the Propositions, containing x and y, x and m, and y and m which can be represented on this diagram (there are ninety-six altogether, so I am sure you will excuse me!) and I must content myself with doing two or three, as specimens. You will do well to work out a lot more for yourself.

Taking the upper half by itself, so that our Subject is “new Cakes”, how are we to represent “no new Cakes are wholesome”?

This is, writing letters for words, “no x are m.” Now this tells us that none of the Cakes, belonging to the upper half of the cupboard, are to be found INSIDE the central Square: that is, the two compartments, No. 11 and No. 12, are EMPTY. And this, of course, is represented by

```
-------------------

|      |      |

|   _______|_______   |

| |   |   | |

| | 0 | 0 | |

| |   |   | |

-------------------
```

And now how are we to represent the contradictory Proposition “SOME x are m”? This is a difficulty I have already considered. I think the best way is to place a red counter ON THE DIVISION-LINE between No. 11 and No. 12, and to understand this to mean that ONE of the two compartments is ‘occupied,’ but that we do not at present know WHICH. This I shall represent thus:—

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|      |      |
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```
|    _____|_____    |

| |   |   | |

| |   -1-   | |

| |   |   | |

-------------------
```

Now let us express “all x are m.”

This consists, we know, of TWO Propositions,

"Some x are m,"

and "No x are m'."

Let us express the negative part first. This tells us that none of the Cakes, belonging to the upper half of the cupboard, are to be found OUTSIDE the central Square: that is, the two compartments, No. 9 and No. 10, are EMPTY. This, of course, is represented by

```
-------------------

| 0     |      0 |

|    _____|_____    |

| |   |   | |

| |   |   | |

| |   |   | |

-------------------
```

But we have yet to represent “Some x are m.” This tells us that there are SOME Cakes in the oblong consisting of No. 11 and No. 12: so we place our red counter, as in the previous example, on the division-line between No. 11 and No. 12, and the result is

```
-------------------

| 0      |       0 |

|    ______|______    |

| |    |    | |

| |    -1-    | |

| |    |    | |

-------------------
```

Now let us try one or two interpretations.

What are we to make of this, with regard to x and y?

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-------------------

|        |      0 |

|    ______|______    |

| |    |    | |

| |  1  |  0  | |

| |    |    | |

-------------------
```

This tells us, with regard to the xy’-Square, that it is wholly ‘empty’, since BOTH compartments are so marked. With regard to the xy-Square, it tells us that it is ‘occupied’. True, it is only ONE compartment of it that is so marked; but that is quite enough, whether the other be ‘occupied’ or ‘empty’, to settle the fact that there is SOMETHING in the Square.

If, then, we transfer our marks to the smaller Diagram, so as to get rid of the m-

subdivisions, we have a right to mark it

```
  -----------
 |   |   |
 | 1 | 0 |
 |   |   |
  -----------
```

which means, you know, “all x are y.”

The result would have been exactly the same, if the given oblong had been marked thus:—

```
-------------------
| 1     |     0 |
|   ______|______   |
| |   |   | |
| |   | 0 | |
| |   |   | |
-------------------
```

Once more: how shall we interpret this, with regard to x and y?

```
-------------------
| 0     |     1 |
|   ______|______   |
| |   |   | |
```

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| |   |   | |

| |   |   | |

-------------------
```

This tells us, as to the xy-Square, that ONE of its compartments is ‘empty’. But this information is quite useless, as there is no mark in the OTHER compartment. If the other compartment happened to be ‘empty’ too, the Square would be ‘empty’: and, if it happened to be ‘occupied’, the Square would be ‘occupied’. So, as we do not know WHICH is the case, we can say nothing about THIS Square.

The other Square, the xy’-Square, we know (as in the previous example) to be ‘occupied’.

If, then, we transfer our marks to the smaller Diagram, we get merely this:—

```
  -----------

|   |   |

|   | 1 |

|   |   |

  -----------
```

which means, you know, “some x are y’.”

```
These principles may be applied to all the other

oblongs.  For instance, to represent

"all y' are m'" we should mark the    -------

RIGHT-HAND UPRIGHT OBLONG (the one   |     |

that has the attribute y') thus:--   |---   |
```

```
| 0 |  |

|---|-1-|

| 0 |  |

|---    |

|      |

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```

and, if we were told to interpret the lower half of the cupboard, marked as follows, with regard to x and y,

```
-------------------

| |    |    | |

| |    |  0  | |

| |    |    | |

|    -----|-----    |

| 1      |       0 |

-------------------
```

we should transfer it to the smaller Diagram thus,

```
-----------

|    |    |

|  1  |  0  |

|    |    |

-----------
```

and read it “all x’ are y.”

Two more remarks about Propositions need to be made.

One is that, in every Proposition beginning with “some” or “all”, the ACTUAL EXISTENCE of the ‘Subject’ is asserted. If, for instance, I say “all misers are selfish,” I mean that misers ACTUALLY EXIST. If I wished to avoid making this assertion, and merely to state the LAW that miserliness necessarily involves selfishness, I should say “no misers are unselfish” which does not assert that any misers exist at all, but merely that, if any DID exist, they WOULD be selfish.

The other is that, when a Proposition begins with “some” or “no”, and contains more that two Attributes, these Attributes may be re-arranged, and shifted from one Term to the other, “ad libitum.” For example, “some abc are def” may be re-arranged as “some bf are acde,” each being equivalent to “some Things are abcdef”. Again “No wise old men are rash and reckless gamblers” may be re-arranged as “No rash old gamblers are wise and reckless,” each being equivalent to “No men are wise old rash reckless gamblers.”

2. Syllogisms

Now suppose we divide our Universe of Things in three ways, with regard to three different Attributes. Out of these three Attributes, we may make up three different couples (for instance, if they were a, b, c, we might make up the three couples ab, ac, bc). Also suppose we have two Propositions given us, containing two of these three couples, and that from them we can prove a third Proposition containing the third couple. (For example, if we divide our Universe for m, x, and y; and if we have the two Propositions given us, “no m are x’” and “all m’ are y”, containing the two couples mx and my, it might be possible to prove from them a third Proposition, containing x and y.)

In such a case we call the given Propositions ‘THE PREMISSES’, the third one ‘THE CONCLUSION’ and the whole set ‘A SYLLOGISM’.

Evidently, ONE of the Attributes must occur in both Premisses; or else one must occur in ONE Premiss, and its CONTRADICTORY in the other.

In the first case (when, for example, the Premisses are “some m are x” and “no m are y’”) the Term, which occurs twice, is called ‘THE MIDDLE TERM’, because it serves as a sort of link between the other two Terms.

In the second case (when, for example, the Premisses are “no m are x’” and “all m’ are y”) the two Terms, which contain these contradictory Attributes, may be called ‘THE MIDDLE TERMS’.

Thus, in the first case, the class of “m-Things” is the Middle Term; and, in the second case, the two classes of “m-Things” and “m’-Things” are the Middle Terms.

The Attribute, which occurs in the Middle Term or Terms, disappears in the Conclusion, and is said to be “eliminated”, which literally means “turned out of doors”.

Now let us try to draw a Conclusion from the two Premisses—

> "Some new Cakes are unwholesome;
>
> No nice Cakes are unwholesome."

In order to express them with counters, we need to divide Cakes in THREE different ways, with regard to newness, to niceness, and to wholesomeness. For this we must use the larger Diagram, making x mean “new”, y “nice”, and m “wholesome”. (Everything INSIDE the central Square is supposed to have the attribute m, and everything OUTSIDE it the attribute m’, i.e. “not-m”.)

You had better adopt the rule to make m mean the Attribute which occurs in the MIDDLE Term or Terms. (I have chosen m as the symbol, because ‘middle’ begins with ‘m’.)

Now, in representing the two Premisses, I prefer to begin with the NEGATIVE one (the one beginning with “no”), because GREY counters can always be placed with CERTAINTY, and will then help to fix the position of the red counters, which are sometimes a little uncertain where they will be most welcome.

Let us express, the “no nice Cakes are unwholesome (Cakes)”, i.e. “no y-Cakes are m’-(Cakes)”. This tells us that none of the Cakes belonging to the y-half of

the cupboard are in its m’-compartments (i.e. the ones outside the central Square). Hence the two compartments, No. 9 and No. 15, are both ‘EMPTY’; and we must place a grey counter in EACH of them, thus:—

```
  -----------
|0   |   |
|  --|--  |
| | | | |
|--|-----|--|
| | | | |
|  --|--  |
|0   |   |
  -----------
```

We have now to express the other Premiss, namely, “some new Cakes are unwholesome (Cakes)”, i.e. “some x-Cakes are m’-(Cakes)”. This tells us that some of the Cakes in the x-half of the cupboard are in its m’-compartments. Hence ONE of the two compartments, No. 9 and No. 10, is ‘occupied’: and, as we are not told in WHICH of these two compartments to place the red counter, the usual rule would be to lay it on the division-line between them: but, in this case, the other Premiss has settled the matter for us, by declaring No. 9 to be EMPTY. Hence the red counter has no choice, and MUST go into No. 10, thus:—

```
  -----------
|0   |   1|
|  --|--  |
| | | | |
|--|-----|--|
```

```
| | | | |

| --|-- |

|0  |  |

 -----------
```

And now what counters will this information enable us to place in the SMALLER Diagram, so as to get some Proposition involving x and y only, leaving out m? Let us take its four compartments, one by one.

First, No. 5. All we know about THIS is that its OUTER portion is empty: but we know nothing about its inner portion. Thus the Square MAY be empty, or it MAY have something in it. Who can tell? So we dare not place ANY counter in this Square.

Secondly, what of No. 6? Here we are a little better off. We know that there is SOMETHING in it, for there is a red counter in its outer portion. It is true we do not know whether its inner portion is empty or occupied: but what does THAT matter? One solitary Cake, in one corner of the Square, is quite sufficient excuse for saying “THIS SQUARE IS OCCUPIED”, and for marking it with a red counter.

As to No. 7, we are in the same condition as with No. 5—we find it PARTLY ‘empty’, but we do not know whether the other part is empty or occupied: so we dare not mark this Square.

And as to No. 8, we have simply no information at all.

The result is

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-------

| | 1 |

|---|---|

| | |
```

Our ‘Conclusion’, then, must be got out of the rather meager piece of information that there is a red counter in the xy’-Square. Hence our Conclusion is “some x are y’ “, i.e. “some new Cakes are not-nice (Cakes)”: or, if you prefer to take y’ as your Subject, “some not-nice Cakes are new (Cakes)”; but the other looks neatest.

We will now write out the whole Syllogism, putting the symbol &there4[*] for “therefore”, and omitting “Cakes”, for the sake of brevity, at the end of each Proposition.

[*][NOTE from Brett: The use of “&there4” is a rather arbitrary selection. There is no font available in general practice which renders the “therefore” symbol correction (three dots in a triangular formation). This can be done, however, in HTML, so if this document is read in a browser, then the symbol will be properly recognized. This is a poor man’s excuse.]

> "Some new Cakes are unwholesome;
>
> No nice Cakes are unwholesome
>
> &there4 Some new Cakes are not-nice."

And you have now worked out, successfully, your first ‘SYLLOGISM’. Permit me to congratulate you, and to express the hope that it is but the beginning of a long and glorious series of similar victories!

We will work out one other Syllogism—a rather harder one than the last—and then, I think, you may be safely left to play the Game by yourself, or (better) with any friend whom you can find, that is able and willing to take a share in the sport.

Let us see what we can make of the two Premisses—

> "All Dragons are uncanny;
>
> All Scotchmen are canny."

Remember, I don’t guarantee the Premisses to be FACTS. In the first place, I

never even saw a Dragon: and, in the second place, it isn’t of the slightest consequence to us, as LOGICIANS, whether our Premisses are true or false: all WE have to do is to make out whether they LEAD LOGICALLY TO THE CONCLUSION, so that, if THEY were true, IT would be true also.

You see, we must give up the “Cakes” now, or our cupboard will be of no use to us. We must take, as our ‘Universe’, some class of things which will include Dragons and Scotchmen: shall we say ‘Animals’? And, as “canny” is evidently the Attribute belonging to the ‘Middle Terms’, we will let m stand for “canny”, x for “Dragons”, and y for “Scotchmen”. So that our two Premisses are, in full,

"All Dragon-Animals are uncanny (Animals);

All Scotchman-Animals are canny (Animals)."

And these may be expressed, using letters for words, thus:—

"All x are m';

All y are m."

The first Premiss consists, as you already know, of two parts:—

"Some x are m',"

and "No x are m."

And the second also consists of two parts:—

"Some y are m,"

and "No y are m'."

Let us take the negative portions first.

We have, then, to mark, on the larger Diagram, first, “no x are m”, and secondly, “no y are m’”. I think you will see, without further explanation, that the two results, separately, are

----------- -----------

```
|   |   |       |0   |   |
|  --|--  |       |  --|--  |
|  |0 | 0|  |       |  |  |  |  |
|--|--|--|--|       |--|--|--|--|
|  |  |  |  |       |  |  |  |  |
|  --|--  |       |  --|--  |
|   |   |       |0   |   |
-----------        -----------
```

and that these two, when combined, give us

```
 -----------
|0   |   |
|  --|--  |
|  |0 | 0|  |
|--|--|--|--|
|  |  |  |  |
|  --|--  |
|0   |   |
 -----------
```

We have now to mark the two positive portions, “some x are m’” and “some y are m”.

The only two compartments, available for Things which are xm’, are No. 9 and No. 10. Of these, No. 9 is already marked as ‘empty’; so our red counter must go

into No. 10.

Similarly, the only two, available for ym, are No. 11 and No. 13. Of these, No. 11 is already marked as ‘empty’; so our red counter MUST go into No. 13.

The final result is

```
  -----------
|0   |   1|
|  --|--  |
|  |0 | 0|  |
|--|--|--|--|
|  |1 |  |  |
|  --|--  |
|0   |    |
  -----------
```

And now how much of this information can usefully be transferred to the smaller Diagram?

Let us take its four compartments, one by one.

As to No. 5? This, we see, is wholly ‘empty’. (So mark it with a grey counter.)

As to No. 6? This, we see, is ‘occupied’. (So mark it with a red counter.)

As to No. 7? Ditto, ditto.

As to No. 8? No information.

The smaller Diagram is now pretty liberally marked:—

```
  -------
```

| 0 | 1 |

|---|---|

| 1 | |

And now what Conclusion can we read off from this? Well, it is impossible to pack such abundant information into ONE Proposition: we shall have to indulge in TWO, this time.

First, by taking x as Subject, we get “all x are y’”, that is,

“All Dragons are not-Scotchmen”:

secondly, by taking y as Subject, we get “all y are x’”, that is,

“All Scotchmen are not-Dragons”.

Let us now write out, all together, our two Premisses and our brace of Conclusions.

"All Dragons are uncanny;

All Scotchmen are canny.

&there4 All Dragons are not-Scotchmen;

All Scotchmen are not-Dragons."

Let me mention, in conclusion, that you may perhaps meet with logical treatises in which it is not assumed that any Thing EXISTS at all, by “some x are y” is

understood to mean “the Attributes x, y are COMPATIBLE, so that a Thing can have both at once”, and “no x are y” to mean “the Attributes x, y are INCOMPATIBLE, so that nothing can have both at once”.

In such treatises, Propositions have quite different meanings from what they have in our ‘Game of Logic’, and it will be well to understand exactly what the difference is.

First take “some x are y”. Here WE understand “are” to mean “are, as an actual FACT”—which of course implies that some x-Things EXIST. But THEY (the writers of these other treatises) only understand “are” to mean “CAN be”, which does not at all imply that any EXIST. So they mean LESS than we do: our meaning includes theirs (for of course “some x ARE y” includes “some x CAN BE y”), but theirs does NOT include ours. For example, “some Welsh hippopotami are heavy” would be TRUE, according to these writers (since the Attributes “Welsh” and “heavy” are quite COMPATIBLE in a hippopotamus), but it would be FALSE in our Game (since there are no Welsh hippopotami to BE heavy).

Secondly, take “no x are y”. Here WE only understand “are” to mean “are, as an actual FACT”—which does not at all imply that no x CAN be y. But THEY understand the Proposition to mean, not only that none ARE y, but that none CAN POSSIBLY be y. So they mean more than we do: their meaning includes ours (for of course “no x CAN be y” includes “no x ARE y”), but ours does NOT include theirs. For example, “no Policemen are eight feet high” would be TRUE in our Game (since, as an actual fact, no such splendid specimens are ever found), but it would be FALSE, according to these writers (since the Attributes “belonging to the Police Force” and “eight feet high” are quite COMPATIBLE: there is nothing to PREVENT a Policeman from growing to that height, if sufficiently rubbed with Rowland’s Macassar Oil—which said to make HAIR grow, when rubbed on hair, and so of course will make a POLICEMAN grow, when rubbed on a Policeman).

Thirdly, take “all x are y”, which consists of the two partial Propositions “some x are y” and “no x are y’”. Here, of course, the treatises mean LESS than we do in the FIRST part, and more than we do in the SECOND. But the two operations don’t balance each other—any more than you can console a man, for having knocked down one of his chimneys, by giving him an extra door-step.

If you meet with Syllogisms of this kind, you may work them, quite easily, by the system I have given you: you have only to make ‘are’ mean ‘are CAPABLE of being’, and all will go smoothly. For “some x are y” will become “some x are capable of being y”, that is, “the Attributes x, y are COMPATIBLE”. And “no x are y” will become “no x are capable of being y”, that is, “the Attributes x, y are INCOMPATIBLE”. And, of course, “all x are y” will become “some x are capable of being y, and none are capable of being y’”, that is, “the Attributes x, y are COMPATIBLE, and the Attributes x, y’ are INCOMPATIBLE.” In using the Diagrams for this system, you must understand a red counter to mean “there may POSSIBLY be something in this compartment,” and a grey one to mean “there cannot POSSIBLY be anything in this compartment.”

3. Fallacies.

And so you think, do you, that the chief use of Logic, in real life, is to deduce Conclusions from workable Premisses, and to satisfy yourself that the Conclusions, deduced by other people, are correct? I only wish it were! Society would be much less liable to panics and other delusions, and POLITICAL life, especially, would be a totally different thing, if even a majority of the arguments, that scattered broadcast over the world, were correct! But it is all the other way, I fear. For ONE workable Pair of Premisses (I mean a Pair that lead to a logical Conclusion) that you meet with in reading your newspaper or magazine, you will probably find FIVE that lead to no Conclusion at all: and, even when the Premisses ARE workable, for ONE instance, where the writer draws a correct Conclusion, there are probably TEN where he draws an incorrect one.

In the first case, you may say “the PREMISSES are fallacious”: in the second, “the CONCLUSION is fallacious.”

The chief use you will find, in such Logical skill as this Game may teach you, will be in detecting ‘FALLACIES’ of these two kinds.

The first kind of Fallacy—‘Fallacious Premisses’—you will detect when, after marking them on the larger Diagram, you try to transfer the marks to the smaller. You will take its four compartments, one by one, and ask, for each in turn, “What mark can I place HERE?”; and in EVERY one the answer will be “No

information!”, showing that there is NO CONCLUSION AT ALL. For instance,

"All soldiers are brave;

Some Englishmen are brave.

&there4 Some Englishmen are soldiers."

looks uncommonly LIKE a Syllogism, and might easily take in a less experienced Logician. But YOU are not to be caught by such a trick! You would simply set out the Premisses, and would then calmly remark “Fallacious PREMISSES!”: you wouldn’t condescend to ask what CONCLUSION the writer professed to draw—knowing that, WHATEVER it is, it MUST be wrong. You would be just as safe as that wise mother was, who said “Mary, just go up to the nursery, and see what Baby’s doing, AND TELL HIM NOT TO DO IT!”

The other kind of Fallacy—‘Fallacious Conclusion’—you will not detect till you have marked BOTH Diagrams, and have read off the correct Conclusion, and have compared it with the Conclusion which the writer has drawn.

But mind, you mustn’t say “FALLACIOUS Conclusion,” simply because it is not IDENTICAL with the correct one: it may be a PART of the correct Conclusion, and so be quite correct, AS FAR AS IT GOES. In this case you would merely remark, with a pitying smile, “DEFECTIVE Conclusion!” Suppose, of example, you were to meet with this Syllogism:—

"All unselfish people are generous;

No misers are generous.

&there4 No misers are unselfish."

the Premisses of which might be thus expressed in letters:—

"All x' are m;

No y are m."

Here the correct Conclusion would be “All x’ are y’” (that is, “All unselfish people are not misers”), while the Conclusion, drawn by the writer, is “No y are

x’,” (which is the same as “No x’ are y,” and so is PART of “All x’ are y’.”) Here you would simply say “DEFECTIVE Conclusion!” The same thing would happen, if you were in a confectioner’s shop, and if a little boy were to come in, put down twopence, and march off triumphantly with a single penny-bun. You would shake your head mournfully, and would remark “Defective Conclusion! Poor little chap!” And perhaps you would ask the young lady behind the counter whether she would let YOU eat the bun, which the little boy had paid for and left behind him: and perhaps SHE would reply “Sha’n’t!”

But if, in the above example, the writer had drawn the Conclusion “All misers are selfish” (that is, “All y are x”), this would be going BEYOND his legitimate rights (since it would assert the EXISTENCE of y, which is not contained in the Premisses), and you would very properly say “Fallacious Conclusion!”

Now, when you read other treatises on Logic, you will meet with various kinds of (so-called) ‘Fallacies’ which are by no means ALWAYS so. For example, if you were to put before one of these Logicians the Pair of Premisses

> "No honest men cheat;
>
> No dishonest men are trustworthy."

and were to ask him what Conclusion followed, he would probably say “None at all! Your Premisses offend against TWO distinct Rules, and are as fallacious as they can well be!” Then suppose you were bold enough to say “The Conclusion is ‘No men who cheat are trustworthy’,” I fear your Logical friend would turn away hastily—perhaps angry, perhaps only scornful: in any case, the result would be unpleasant. I ADVISE YOU NOT TO TRY THE EXPERIMENT!

“But why is this?” you will say. “Do you mean to tell us that all these Logicians are wrong?” Far from it, dear Reader! From THEIR point of view, they are perfectly right. But they do not include, in their system, anything like ALL the possible forms of Syllogisms.

They have a sort of nervous dread of Attributes beginning with a negative particle. For example, such Propositions as “All not-x are y,” “No x are not-y,” are quite outside their system. And thus, having (from sheer nervousness) excluded a quantity of very useful forms, they have made rules which, though quite applicable to the few forms which they allow of, are no use at all when you consider all possible forms.

Let us not quarrel with them, dear Reader! There is room enough in the world for both of us. Let us quietly take our broader system: and, if they choose to shut their eyes to all these useful forms, and to say “They are not Syllogisms at all!” we can but stand aside, and let them Rush upon their Fate! There is scarcely anything of yours, upon which it is so dangerous to Rush, as your Fate. You may Rush upon your Potato-beds, or your Strawberry-beds, without doing much harm: you may even Rush upon your Balcony (unless it is a new house, built by contract, and with no clerk of the works) and may survive the foolhardy enterprise: but if you once Rush upon your FATE—why, you must take the consequences!

CHAPTER II.

CROSS QUESTIONS.

Table of Contents

"The Man in the Wilderness asked of me

'How many strawberries grow in the sea?'"

---

1. Elementary.

1. What is an ‘Attribute’? Give examples.

2. When is it good sense to put “is” or “are” between two names? Give examples.

3. When is it NOT good sense? Give examples.

4. When it is NOT good sense, what is the simplest agreement to make, in order to make good sense?

5. Explain ‘Proposition’, ‘Term’, ‘Subject’, and ‘Predicate’. Give examples.

6. What are ‘Particular’ and ‘Universal’ Propositions? Give examples.

7. Give a rule for knowing, when we look at the smaller Diagram, what Attributes belong to the things in each compartment.

8. What does “some” mean in Logic? [See pp. 55, 6]

9. In what sense do we use the word ‘Universe’ in this Game?

10. What is a ‘Double’ Proposition? Give examples.

11. When is a class of Things said to be ‘exhaustively’ divided? Give examples.

12. Explain the phrase “sitting on the fence.”

13. What two partial Propositions make up, when taken together, “all x are y”?

14. What are ‘Individual’ Propositions? Give examples.

15. What kinds of Propositions imply, in this Game, the EXISTENCE of their Subjects?

16. When a Proposition contains more than two Attributes, these Attributes may in some cases be re-arranged, and shifted from one Term to the other. In what cases may this be done? Give examples.

Break up each of the following into two partial Propositions: 17. All tigers are fierce.

18. All hard-boiled eggs are unwholesome.

19. I am happy.

20. John is not at home.

[See pp. 56, 7]

21. Give a rule for knowing, when we look at the larger Diagram, what Attributes belong to the Things contained in each compartment.

22. Explain ‘Premisses’, ‘Conclusion’, and ‘Syllogism’. Give examples.

23. Explain the phrases ‘Middle Term’ and ‘Middle Terms’.

24. In marking a pair of Premisses on the larger Diagram, why is it best to mark NEGATIVE Propositions before AFFIRMATIVE ones?

25. Why is it of no consequence to us, as Logicians, whether the Premisses are true or false?

26. How can we work Syllogisms in which we are told that “some x are y” is to be understood to mean “the Attribute x, y are COMPATIBLE”, and “no x are y” to mean “the Attributes x, y are INCOMPATIBLE”?

27. What are the two kinds of ‘Fallacies’?

28. How may we detect ‘Fallacious Premisses’?

29. How may we detect a ‘Fallacious Conclusion’?

30. Sometimes the Conclusion, offered to us, is not identical with the correct Conclusion, and yet cannot be fairly called ‘Fallacious’. When does this happen? And what name may we give to such a Conclusion?

[See pp. 57-59]

2. Half of Smaller Diagram.

Propositions to be represented.

```
  -----------
|   |   |
|   x   |
```

| | |

--y-----y'-

---

1. Some x are not-y.

2. All x are not-y.

3. Some x are y, and some are not-y.

4. No x exist.

5. Some x exist.

6. No x are not-y.

7. Some x are not-y, and some x exist.

Taking x=“judges”; y=“just”;

8. No judges are just.

9. Some judges are unjust.

10. All judges are just.

Taking x=“plums”; y=“wholesome”;

11. Some plums are wholesome.

12. There are no wholesome plums.

13. Plums are some of them wholesome, and some not.

14. All plums are unwholesome.

[See pp. 59, 60]

```
      -----
     |    |
     |    x
     |    |
     |--y--|
     |    |
     |    x'
     |    |
      -----
```

____

Taking y=“diligent students”; x=“successful”; 15. No diligent students are unsuccessful.

16. All diligent students are successful.

17. No students are diligent.

18. There are some diligent, but unsuccessful, students.

19. Some students are diligent.

[See pp. 60, 1]

3. Half of Smaller Diagram.

Symbols to be interpreted.

```
-----------
|   |   |
|   x   |
|   |   |
--y-----y'-
```

```
      -------       -------
    | | |        | | |
1.  | | 0 |   2.  | 0 | 0 |
    | | |        | | |
      -------       -------


      -------       -------
    | | |        | | |
3.  |  -  |   4.  | 0 | 1 |
    | | |        | | |
```

```
          -------       -------
```

Taking x=“good riddles”; y=“hard”;

```
          -------       -------
         |   |   |     |   |   |
     5.  | 1 |   |  6. | 1 | 0 |
         |   |   |     |   |   |
          -------       -------

          -------       -------
         |   |   |     |   |   |
     7.  | 0 | 0 |  8. | 0 |   |
         |   |   |     |   |   |
          -------       -------
```

[See pp. 61, 2]

Taking x=“lobster”; y=“selfish”;

```
          -------       -------
         |   |   |     |   |   |
     9.  |   | 1 | 10. | 0 |   |
         |   |   |     |   |   |
```

```
      -------      -------

      -------      -------

     | | |       | | |

11.  | 0 | 1 |   12.  | 1 | 1 |

     | | |       | | |

      -------      -------
```

___

```
   -----

  |   |

  x   |

  |   |

  |--y'-|

  |   |

  x'   |

  |   |

   -----
```

Taking y=“healthy people”; x=“happy”;

```
    ---       ---       ---       ---

   | 0 |     |  |      | 1 |     | 0 |

13.  |---|  14.  |-1-|  15.  |---|  16.  |---|
```

```
    | 1 |      |  |      | 1 |      |  |
     ---        ---        ---        ---
```

[See p. 62]

4. Smaller Diagram.

Propositions to be represented.

```
-----------
|   |   |
|   x   |
|--y--|--y'-|
|   x'   |
|   |   |
-----------
```

1. All y are x.

2. Some y are not-x.

3. No not-x are not-y.

4. Some x are not-y.

5. Some not-y are x.

6. No not-x are y.

7. Some not-x are not-y.

8. All not-x are not-y.

9. Some not-y exist.

10. No not-x exist.

11. Some y are x, and some are not-x.

12. All x are y, and all not-y are not-x.

[See pp. 62, 3]

Taking “nations” as Universe; x=“civilised”; y=“warlike”; 13. No uncivilised nation is warlike.

14. All unwarlike nations are uncivilised.

15. Some nations are unwarlike.

16. All warlike nations are civilised, and all civilised nations are warlike.

17. No nation is uncivilised.

Taking “crocodiles” as Universe; x=“hungry”; and y=“amiable”; 18. All hungry crocodiles are unamiable.

19. No crocodiles are amiable when hungry.

20. Some crocodiles, when not hungry, are amiable; but some are not.

21. No crocodiles are amiable, and some are hungry.

22. All crocodiles, when not hungry, are amiable; and all unamiable crocodiles

are hungry.

23. Some hungry crocodiles are amiable, and some that are not hungry are unamiable.

[See pp. 63, 4]

5. Smaller Diagram.

Symbols to be interpreted.

```
   -----------
  |   |   |
  |   x   |
  |--y--|--y'-|
  |   x'   |
  |   |   |
   -----------
```

```
   -------      -------
  | | |        | | |
```

```
1.  |---|---|     2.  |---|---|

    | 1 |   |         |   | 0 |

      -------           -------

      -------           -------

    |   | 1 |         |   |   |

3.  |---|---|     4.  |---|---|

    |   | 0 |         | 0 | 0 |

      -------           -------
```

Taking "houses" as Universe; x="built of brick"; and y="two-storied"; interpret

```
      -------           -------

    | 0 |   |         |   |   |

5.  |---|---|     6.  |---|---|

    | 0 |   |         |   -   |

      -------           ---|---

      -------           -------

    |   | 0 |         |   |   |

7.  |---|---|     8.  |---|---|

    |   |   |       | 0 | 1 |

      -------           -------
```

[See p. 65]

```
         -------       -------
        | 1 | 1 |     |   | 0 |
    9.  |---|---| 10. |---|---|
        |   |   |     |   | 1 |
         -------       -------
```

```
         -------       -------
        | 0 | 1 |     | 1 |   |
    11. |---|---| 12. |---|---|
        |   | 0 |     | 0 | 1 |
         -------       -------
```

Taking “cats” as Universe; x=“green-eyed”; and y=“good-tempered”; interpret

```
         -------       -------
        | 0 | 0 |     |   | 1 |
    13. |---|---| 14. |---|---|
        |   | 0 |     | 1 |   |
         -------       -------
```

```
         -------       -------
        | 1 |   |     | 0 | 1 |
```

```
15.  |---|---|      16.  |---|---|
   |  | 0 |         | 1 | 0 |
     -------          -------
```

[See pp. 65, 6]

6. Larger Diagram.

Propositions to be represented.

```
-----------
|    |    |
|  --x--  |
| | | | | |
|--y--m--y'-|
| | | | | |
|  --x'-  |
|    |    |
-----------
```

---

1. No x are m.

2. Some y are m’.

3. All m are x’.

4. No m’ are y’.

5. No m are x; All y are m.

6. Some x are m; No y are m.

7. All m are x’; No m are y.

8. No x’ are m; No y’ are m’.

[See pp. 67,8]

Taking “rabbits” as Universe; m=“greedy”; x=“old”; and y=“black”; represent 9. No old rabbits are greedy.

10. Some not-greedy rabbits are black.

11. All white rabbits are free from greediness.

12. All greedy rabbits are young.

13. No old rabbits are greedy; All black rabbits are greedy.

14. All rabbits, that are not greedy, are black; No old rabbits are free from greediness.

Taking “birds” as Universe; m=“that sing loud”; x=“well-fed”; and y=“happy”; represent 15. All well-fed birds sing loud; No birds, that sing loud, are unhappy.

16. All birds, that do not sing loud, are unhappy; No well-fed birds fail to sing loud.

Taking “persons” as Universe; m=“in the house”; x=“John”; and y=“having a tooth-ache”; represent 17. John is in the house; Everybody in the house is suffering from tooth-ache.

18. There is no one in the house but John; Nobody, out of the house, has a tooth-ache.

[See pp. 68-70]

Taking “persons” as Universe; m=“I”; x=“that has taken a walk”; y=“that feels better”; represent 19. I have been out for a walk; I feel much better.

Choosing your own ‘Universe’ &c., represent 20. I sent him to bring me a kitten; He brought me a kettle by mistake.

[See pp. 70, 1]

7. Both Diagrams to be employed.

```
  -----------
|   |   |     -----------
| --x-- |   |   |   |
| | | | |   |   x   |
```

```
    |--y--m--y'-|   |--y--|--y'-|
    | | | | |   |   x'   |
    | --x'- |   |   |   |
    |   |   |   -----------
     -----------
```

____

N.B. In each Question, a small Diagram should be drawn, for x and y only, and marked in accordance with the given large Diagram: and then as many Propositions as possible, for x and y, should be read off from this small Diagram.

```
       -----------         -----------
       |0   |   |          |   |   |
       | --|-- |          | --|-- |
       | |0 | 0| |         | |0 | 1| |
    1.  |--|--|--|--|   2.  |--|--|--|--|
       | |1 | | |          | |0 | | |
       | --|-- |          | --|-- |
       |0   |   |          |   |   |
       -----------         -----------
```

[See p. 72]

```
       -----------         -----------
```

```
        |   |   |          |   |   0|
        |  --|--  |          |  --|--  |
        |  |0 | 0|  |          |  |  |  |  |
     3.  |--|--|--|--|     4.  |--|--|--|--|
        |  |1 | 0|  |          |  |0 |  |  |
        |  --|--  |          |  --|--  |
        |   |   |          |   |   0|
        -----------        -----------
```

Mark, in a large Diagram, the following pairs of Propositions from the preceding Section: then mark a small Diagram in accordance with it, &c.

5. No. 13. [see p. 49]   9. No. 17.

6. No. 14.   10. No. 18.

7. No. 15.   11. No. 19. [see p. 50]

8. No. 16.   12. No. 20.

Mark, on a large Diagram, the following Pairs of Propositions: then mark a small Diagram, &c. These are, in fact, Pairs of PREMISSES for Syllogisms: and

the results, read off from the small Diagram, are the CONCLUSIONS.

13. No exciting books suit feverish patients; Unexciting books make one drowsy.

14. Some, who deserve the fair, get their deserts; None but the brave deserve the fair.

15. No children are patient; No impatient person can sit still.

[See pp. 72-5]

16. All pigs are fat; No skeletons are fat.

17. No monkeys are soldiers; All monkeys are mischievous.

18. None of my cousins are just; No judges are unjust.

19. Some days are rainy; Rainy days are tiresome.

20. All medicine is nasty; Senna is a medicine.

21. Some Jews are rich; All Patagonians are Gentiles.

22. All teetotalers like sugar; No nightingale drinks wine.

23. No muffins are wholesome; All buns are unwholesome.

24. No fat creatures run well; Some greyhounds run well.

25. All soldiers march; Some youths are not soldiers.

26. Sugar is sweet; Salt is not sweet.

27. Some eggs are hard-boiled; No eggs are uncrackable.

28. There are no Jews in the house; There are no Gentiles in the garden.

[See pp. 75-82]

29. All battles are noisy; What makes no noise may escape notice.

30. No Jews are mad; All Rabbis are Jews.

31. There are no fish that cannot swim; Some skates are fish.

32. All passionate people are unreasonable; Some orators are passionate.

[See pp. 82-84]

CHAPTER III.

CROOKED ANSWERS.

Table of Contents

"I answered him, as I thought good,

'As many as red-herrings grow in the wood'."

---

1. Elementary.

1. Whatever can be "attributed to", that is "said to belong to", a Thing, is called an 'Attribute'. For example, "baked", which can (frequently) be attributed to "Buns", and "beautiful", which can (seldom) be attributed to "Babies".

2. When they are the Names of two Things (for example, "these Pigs are fat Animals"), or of two Attributes (for example, "pink is light red").

3. When one is the Name of a Thing, and the other the Name of an Attribute (for example, "these Pigs are pink"), since a Thing cannot actually BE an Attribute.

4. That the Substantive shall be supposed to be repeated at the end of the sentence (for example, "these Pigs are pink (Pigs)").

5. A 'Proposition' is a sentence stating that some, or none, or all, of the Things belonging to a certain class, called the 'Subject', are also Things belonging to a

certain other class, called the ‘Predicate’. For example, “some new Cakes are not nice”, that is (written in full) “some new Cakes are not nice Cakes”; where the class “new Cakes” is the Subject, and the class “not-nice Cakes” is the Predicate.

6. A Proposition, stating that SOME of the Things belonging to its Subject are so-and-so, is called ‘Particular’. For example, “some new Cakes are nice”, “some new Cakes are not nice.”

A Proposition, stating that NONE of the Things belonging to its Subject, or that ALL of them, are so-and-so, is called ‘Universal’. For example, “no new Cakes are nice”, “all new Cakes are not nice”.

7. The Things in each compartment possess TWO Attributes, whose symbols will be found written on two of the EDGES of that compartment.

8. “One or more.”

9. As a name of the class of Things to which the whole Diagram is assigned.

10. A Proposition containing two statements. For example, “some new Cakes are nice and some are not-nice.”

11. When the whole class, thus divided, is “exhausted” among the sets into which it is divided, there being no member of it which does not belong to some one of them. For example, the class “new Cakes” is “exhaustively” divided into “nice” and “not-nice” since EVERY new Cake must be one or the other.

12. When a man cannot make up his mind which of two parties he will join, he is said to be “sitting on the fence”—not being able to decide on which side he will jump down.

13. “Some x are y” and “no x are y’”.

14. A Proposition, whose Subject is a single Thing, is called ‘Individual’. For example, “I am happy”, “John is not at home”. These are Universal Propositions, being the same as “all the I’s that exist are happy”, “ALL the Johns, that I am now considering, are not at home”.

15. Propositions beginning with “some” or “all”.

16. When they begin with “some” or “no”. For example, “some abc are def” may be re-arranged as “some bf are acde”, each being equivalent to “some abcdef exist”.

17. Some tigers are fierce, No tigers are not-fierce.

18. Some hard-boiled eggs are unwholesome, No hard-boiled eggs are wholesome.

19. Some I’s are happy, No I’s are unhappy.

20. Some Johns are not at home, No Johns are at home.

21. The Things, in each compartment of the larger Diagram, possess THREE Attributes, whose symbols will be found written at three of the CORNERS of the compartment (except in the case of m’, which is not actually inserted in the Diagram, but is SUPPOSED to stand at each of its four outer corners).

22. If the Universe of Things be divided with regard to three different Attributes; and if two Propositions be given, containing two different couples of these Attributes; and if from these we can prove a third Proposition, containing the two Attributes that have not yet occurred together; the given Propositions are called ‘the Premisses’, the third one ‘the Conclusion’, and the whole set ‘a Syllogism’. For example, the Premisses might be “no m are x’” and “all m’ are y”; and it might be possible to prove from them a Conclusion containing x and y.

23. If an Attribute occurs in both Premisses, the Term containing it is called ‘the Middle Term’. For example, if the Premisses are “some m are x” and “no m are y’”, the class of “m-Things” is ‘the Middle Term.’

If an Attribute occurs in one Premiss, and its contradictory in the other, the Terms containing them may be called ‘the Middle Terms’. For example, if the Premisses are “no m are x’” and “all m’ are y”, the two classes of “m-Things” and “m’-Things” may be called ‘the Middle Terms’.

24. Because they can be marked with CERTAINTY: whereas AFFIRMATIVE Propositions (that is, those that begin with “some” or “all”) sometimes require us to place a red counter ‘sitting on a fence’.

25. Because the only question we are concerned with is whether the Conclusion

FOLLOWS LOGICALLY from the Premisses, so that, if THEY were true, IT also would be true.

26. By understanding a red counter to mean “this compartment CAN be occupied”, and a grey one to mean “this compartment CANNOT be occupied” or “this compartment MUST be empty”.

27. ‘Fallacious Premisses’ and ‘Fallacious Conclusion’.

28. By finding, when we try to transfer marks from the larger Diagram to the smaller, that there is ‘no information’ for any of its four compartments.

29. By finding the correct Conclusion, and then observing that the Conclusion, offered to us, is neither identical with it nor a part of it.

30. When the offered Conclusion is PART of the correct Conclusion. In this case, we may call it a ‘Defective Conclusion’.

2. Half of Smaller Diagram.

Propositions represented.

____

```
          -------         -------
        | | |         | | |
    1.  | | 1 |     2.  | 0 | 1 |
        | | |         | | |
          -------         -------
```

```
            -------        -------

          | | |        | | |

        3.  | 1 | 1 |     4.  | 0 | 0 |

          | | |        | | |

            -------        -------

            -------        -------

          | | |        | | |

        5.  |  1  |     6.  |  | 0 |

          | | |        | | |

            -------        -------

     -------

     | | |

  7.  | 1 | 1 |  It might be thought that the proper


     | | |

     -------    -------

              | | |

Diagram would be  |  1 1 |, in order to express "some

              | | |

              -------
```

x exist": but this is really contained in "some x are y'."

To put a red counter on the division-line would only tell us "ONE OF THE compartments is occupied", which we know already, in knowing that ONE is occupied.

```
                     -------
                    | | |
 8.  No x are y.  i.e.  | 0 |  |
                    | | |
                     -------

                       -------
                      | | |
 9.  Some x are y'.  i.e.  |  | 1 |
                      | | |
                       -------

                     -------
                      | | |
10.  All x are y.  i.e.  | 1 | 0 |
                      | | |
                     -------

                       -------
                      | | |
11.  Some x are y.  i.e.  | 1 |  |
```

| | |

| | |

12. No x are y. i.e. | 0 | |

| | |

| | |

13. Some x are y, and some are y'. i.e. | 1 | 1 |

| | |

| | |

14. All x are y'. i.e. | 0 | 1 |

| | |

| |

15. No y are x'. i.e. |---|

| 0 |

| 1 |

16. All y are x. i.e. |---|

| 0 |

| 0 |

17. No y exist. i.e. |---|

| 0 |

| |

18. Some y are x'. i.e. |---|

| 1 |

| |

15. Some y exist. i.e. |-1-|

| |

---

3. Half of Smaller Diagram.

Symbols interpreted.

———————

1. No x are y’.

2. No x exist.

3. Some x exist.

4. All x are y’.

5. Some x are y. i.e. Some good riddles are hard.

6. All x are y. i.e. All good riddles are hard.

7. No x exist. i.e. No riddles are good.

8. No x are y. i.e. No good riddles are hard.

9. Some x are y’. i.e. Some lobsters are unselfish.

10. No x are y. i.e. No lobsters are selfish.

11. All x are y’. i.e. All lobsters are unselfish.

12. Some x are y, and some are y’. i.e. Some lobsters are selfish, and some are unselfish.

13. All y’ are x’. i.e. All invalids are unhappy.

14. Some y’ exist. i.e. Some people are unhealthy.

15. Some y’ are x, and some are x’. i.e. Some invalids are happy, and some are unhappy.

16. No y’ exist. i.e. Nobody is unhealthy.

4. Smaller Diagram.

Propositions represented.

____

```
     -------         -------

     | 1 |  |        |  |  |

1.  |---|---|    2.  |---|---|

     | 0 |  |        | 1 |  |

     -------         -------

     -------         -------

     |  |  |         |  | 1 |

3.  |---|---|    4.  |---|---|

     |  | 0 |        |  |  |

     -------         -------

     -------         -------

     |  | 1 |        |  |  |

5.  |---|---|    6.  |---|---|
```

```
      | | |        | 0 |  |
      -------        -------
      -------        -------
      | | |        | | |
  7.  |---|---|    8.  |---|---|
      |  | 1 |        | 0 | 1 |
      -------        -------
      -------        -------
      | | |        | | |
  9.  |---|-1-|    10.  |---|---|
      | | |        | 0 | 0 |
      -------        -------
      -------        -------
      | 1 |  |        | 1 | 0 |
 11.  |---|---|    12.  |---|---|
      | 1 |  |        |  | 1 |
      -------        -------


          -------
          | | |
13.  No x' are y.  i.e.  |---|---|
```

| 0 | |

| | 0 |

14. All y' are x'. i.e. |---|---|

| | 1 |

| | |

15. Some y' exist. i.e. |---|-1-|

| | |

| 1 | 0 |

16. All y are x, and all x are y. i.e. |---|---|

| 0 | |

| | |

17. No x' exist. i.e. |---|---|

| 0 | 0 |

| 0 | 1 |

18. All x are y'. i.e. |---|---|

| | |

| 0 | |

19. No x are y. i.e. |---|---|

| | |

| | |

20. Some x' are y, and some are y'. i.e. |---|---|

| 1 | 1 |

| 0 | 1 |

21. No y exist, and some x exist. i.e. |---|---|

| 0 | |

| | 1 |

22. All x' are y, and all y' are x. i.e. |---|---|

| 1 | 0 |

| 1 | |

17. Some x are y, and some x' are y'. i.e. |---|---|

| | 1 |

----

5. Smaller Diagram.

Symbols interpreted.

____

1. Some y are not-x, or, Some not-x are y.

2. No not-x are not-y, or, No not-y are not-x.

3. No not-y are x.

4. No not-x exist. i.e. No Things are not-x.

5. No y exist. i.e. No houses are two-storied.

6. Some x’ exist. i.e. Some houses are not built of brick.

7. No x are y’. Or, no y’ are x. i.e. No houses, built of brick, are other than two-storied. Or, no houses, that are not two-storied, are built of brick.

8. All x’ are y’. i.e. All houses, that are not built of brick, are not two-storied.

9. Some x are y, and some are y’. i.e. Some fat boys are active, and some are not.

10. All y’ are x’. i.e. All lazy boys are thin.

11. All x are y’, and all y’ are x. i.e. All fat boys are lazy, and all lazy ones are fat.

12. All y are x, and all x’ are y. i.e. All active boys are fat, and all thin ones are lazy.

13. No x exist, and no y’ exist. i.e. No cats have green eyes, and none have bad tempers.

14. Some x are y’, and some x’ are y. Or some y are x’, and some y’ are x. i.e. Some green-eyed cats are bad-tempered, and some, that have not green eyes, are good-tempered. Or, some good-tempered cats have not green eyes, and some bad-tempered ones have green eyes.

15. Some x are y, and no x’ are y’. Or, some y are x, and no y’ are x’. i.e. Some green-eyed cats are good-tempered, and none, that are not green-eyed, are bad-tempered. Or, some good-tempered cats have green eyes, and none, that are bad-tempered, have not green eyes.

16. All x are y’, and all x’ are y. Or, all y are x’, and all y’ are x. i.e. All green-eyed cats are bad-tempered and all, that have not green eyes, are good-tempered. Or, all good-tempered ones have eyes that are not green, and all bad-tempered ones have green eyes.

6. Larger Diagram.

Propositions represented.

____

```
      --------------          --------------
      |    |    |         |    |    |
      |   ---|---   |         |   ---|---   |
      |  | 0 | 0 |  |         |  |  |  |  |
   1.  |---|---|---|---|     2.  |-1-|---|---|---|
      |  |  |  |  |         |  |  |  |  |
      |   ---|---   |         |   ---|---   |
      |    |    |         |    |    |
      --------------          --------------


      --------------          --------------
      |    |    |         |    |   0 |
      |   ---|---   |         |   ---|---   |
      |  | 0 | 0 |  |         |  |  |  |  |
   3.  |---|---|---|---|     4.  |---|---|---|---|
      |  |  -  |  |         |  |  |  |  |
      |   ---|---   |         |   ---|---   |
```

```
   |     |     |          |     |   0 |
   ---------------          ---------------


   ---------------          ---------------
   | 0   |     |          |     |     |
   |   ---|---   |          |   ---|---   |
   | | 0 | 0 | |          | | 0 | 1 | |
5. |---|---|---|---|      6. |---|---|---|---|
   | | 1 | | |          | | 0 | | |
   |   ---|---   |          |   ---|---   |
   | 0   |     |          |     |     |
   ---------------          ---------------


   ---------------          ---------------
   |     |     |          |     |   0 |
   |   ---|---   |          |   ---|---   |
   | | 0 | 0 | |          | | | | |
7. |---|---|---|---|      8. |---|---|---|---|
   | | 0 | 1 | |          | | 0 | 0 | |
   |   ---|---   |          |   ---|---   |
   |     |     |          |     |   0 |
```

```
        ---------------         ---------------


                  ---------------
                 |     |     |
                 |   ---|---   |
                 |  | 0 | 0 |  |
9.  No x are m.  i.e.  |---|---|---|---|
                 |  | 0 |  |  |
                 |   ---|---   |
                 |     |     |
                  ---------------


                    ---------------
                   |     |     |
                   |   ---|---   |
                   |  |  |  |  |
10.  Some m' are y.  i.e.  |-1-|---|---|---|
                   |  |  |  |  |
                   |   ---|---   |
                   |     |     |
                    ---------------
```

```
                 ---------------
                 |     |     |
                 |   ---|---   |
                 | |  | 0 |  |
11.  All y' are m'.  i.e.  |---|---|---|-1-|
                 | |  | 0 |  |
                 |   ---|---   |
                 |     |     |
                 ---------------
                 ---------------
                |     |     |
                |   ---|---   |
                | | 0 | 0 |  |
12.  All m are x'.  i.e.  |---|---|---|---|
                | |  1  | |
                |   ---|---   |
                |     |     |
                 ---------------
                  ---------------
                  | 0    |     |
```

```
                    |   ---|---   |
                    |  | 0 | 0 |  |
13.  No x are m;     i.e.  |---|---|---|---|
     All y are m.          |  | 1 |  |  |
                    |   ---|---   |
                    | 0   |      |
                    ---------------
                      ---------------
                    | 0   |   0 |
                    |   ---|---   |
                    |  |  |  |  |
14.  All m' are y;    i.e.  |---|---|---|---|
     No x are m'.          |  |  |  |  |
                    |   ---|---   |
                    | 1   |   0 |
                      ---------------


                    ---------------
                    | 0   |   0 |
                    |   ---|---   |
                    |  | 1 | 0 |  |
```

```
15.  All x are m;      i.e.  |---|---|---|---|
     No m are y'.            |  |  | 0 |  |
                       |    ---|---    |
                       |      |      |
                       ---------------
                         ---------------
                         | 0    |    0 |
                         |    ---|---    |
                         |  |  |  |  |
16.  All m' are y';      i.e.  |---|---|---|---|
     No x are m'.              |  |  |  |  |
                         |    ---|---    |
                         | 0    |    1 |
                         ---------------
                         ---------------
                       | 0    |    0 |
                       |    ---|---    |
                       |  | 1 | 0 |  |
17.  All x are m;      i.e.  |---|---|---|---|
     All m are y.           |  |  | 0 |  |
                       |    ---|---    |
```

[See remarks on No. 7, p. 60.] | | |

| 0 | |

| ---|--- |

| | | | |

18. No x' are m;   i.e. |---|---|---|---|

No m' are y. | | 0 | 0 | |

| ---|--- |

| 0 | |

| | |

| ---|--- |

| | 1 | 0 | |

19. All m are x;   i.e. |---|---|---|---|

All m are y. | | 0 | 0 | |

| ---|--- |

| | |

----

20. We had better take “persons” as Universe. We

may choose “myself” as ‘Middle Term’, in which case the Premisses will take the form

I am a-person-who-sent-him-to-bring-a-kitten;

I am a-person-to-whom-he-brought-a-kettle-by-mistake.

Or we may choose “he” as ‘Middle Term’, in which case the Premisses will take the form

He is a-person-whom-I-sent-to-bring-me-a-kitten;

He is a-person-who-brought-me-a-kettle-by-mistake.

The latter form seems best, as the interest of the anecdote clearly depends on HIS stupidity—not on what happened to ME. Let us then make m = “he”; x = “persons whom I sent, &c.”; and y = “persons who brought, &c.”

Hence, All m are x;

All m are y.   and the required Diagram is

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|     |     |
|   ---|---   |
| | 1 | 0 | |
|---|---|---|---|
| | 0 | 0 | |
|   ---|---   |
|     |     |
  ---------------
```

7. Both Diagrams employed.

```
   -------
   | 0 |  |
1. |---|---|  i.e.  All y are x'.
   | 1 |  |
   -------

   -------
   |  | 1 |
2. |---|---|  i.e.  Some x are y'; or, Some y' are x.
   |  |  |
   -------

   -------
   |  |  |
3. |---|---|  i.e.  Some y are x'; or, Some x' are y.
   | 1 |  |
   -------

   -------
   |  |  |
```

4. |---|---| i.e. No x' are y'; or, No y' are x'.

| | 0 |

| 0 | |

5. |---|---| i.e. All y are x'. i.e. All black rabbits

| 1 | | are young.

| | |

6. |---|---| i.e. Some y are x'. i.e. Some black

| 1 | | rabbits are young.

| 1 | 0 |

7. |---|---| i.e. All x are y. i.e. All well-fed birds

| | | are happy.

| | | i.e. Some x' are y'. i.e. Some birds,

8. |---|---| that are not well-fed, are unhappy;

| | 1 | or, Some unhappy birds are not

-------   well-fed.

| 1 | 0 |

9. |---|---| i.e. All x are y. i.e. John has got a

| | | tooth-ache.

| | |

10. |---|---| i.e. No x' are y. i.e. No one, but John,

| 0 | | has got a tooth-ache.

| 1 | |

11. |---|---| i.e. Some x are y. i.e. Some one, who

| | | has taken a walk, feels better.

| 1 | | i.e. Some x are y. i.e. Some one,

12. |---|---| whom I sent to bring me a kitten,

```
  | | |      brought me a kettle by mistake.


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  ---------------
 |    |   0 |
 |   ---|---   |
 | | 0 | 0 | |
13.  |-1-|---|---|---|      -------
 | | | | |    | | 0 |
 |   ---|---   |     |---|---|
 |    |   0 |     | | |
  ---------------      -------
```

Let "books" be Universe; m="exciting",

x="that suit feverish patients"; y="that make

one drowsy".

No m are x; &there4 No y' are x.

All m' are y.

i.e. No books suit feverish patients, except such as make

one drowsy.

```
      ---------------
   |     |     |
   |   ---|---   |
   |  | 1 | 0 |  |
14.  |---|---|---|---|       -------
   |  |  | 0 |  |     | 1 |  |
   |   ---|---   |     |---|---|
   |     |     |     |  |  |
      ---------------       -------
```

Let "persons" be Universe; m="that deserve the fair";

x="that get their deserts"; y="brave".

Some m are x; &there4 Some y are x.

No y' are m.

i.e. Some brave persons get their deserts.

```
   | 0    |       |
   |    ---|---    |
   |  | 0 | 0 |  |
15.  |---|---|---|---|        -------
   |  |  |  |  |      | 0 |  |
   |    ---|---    |      |---|---|
   | 0    |       |      |  |  |
     ---------------        -------
```

Let "persons" be Universe; m="patient";

x="children"; y="that can sit still".

No x are m; &there4 No x are y.

No m' are y.

i.e. No children can sit still.

```
     ---------------
   | 0    |    0 |
   |    ---|---    |
   |  | 0 | 1 |  |
16.  |---|---|---|---|        -------
```

```
| | 0 |  |  |     | 0 | 1 |
|    ---|---    |      |---|---|
|      |      |      |  |  |
  ---------------        -------
```

Let "things" be Universe; m="fat"; x="pigs";

y="skeletons".

All x are m; &there4 All x are y'.

No y are m.

i.e. All pigs are not-skeletons.

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|      |      |
|    ---|---    |
| | 0 | 0 |  |
17.  |---|---|---|---|        -------
| | 1 | 0 |  |      |  |  |
|    ---|---    |      |---|---|
|      |      |      | 1 |  |
  ---------------        -------
```

Let "creatures" be Universe; m="monkeys";

x="soldiers"; y="mischievous".

No m are x; &there4 Some y are x'.

All m are y.

i.e. Some mischievous creatures are not soldiers.

```
  ---------------
 | 0   |     |
 |   ---|---   |
 |  | 0 | 0 |  |
18. |---|---|---|---|       -------
 |  |  |  |  |      | 0 |  |
 |   ---|---   |     |---|---|
 | 0   |     |     |  |  |
  ---------------       -------
```

Let "persons" be Universe; m="just";

x="my cousins"; y="judges".

No x are m; &there4 No x are y.

No y are m'.

i.e. None of my cousins are judges.

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  |     |     |
  |   ---|---   |
  | | 1 | 0 | |
19. |---|---|---|---|       -------
  | | | | |     | 1 | |
  |   ---|---   |     |---|---|
  |     |     |     | | |
   ---------------       -------
```

Let "periods" be Universe; m="days";

x="rainy"; y="tiresome".

Some m are x; &there4 Some x are y.

All xm are y.

i.e. Some rainy periods are tiresome.

N.B. These are not legitimate Premisses, since the Conclusion is really part of the second Premiss, so that the first Premiss is superfluous. This may be shown, in letters, thus:—

“All xm are y” contains “Some xm are y”, which contains “Some x are y”. Or, in words, “All rainy days are tiresome” contains “Some rainy days are tiresome”, which contains “Some rainy periods are tiresome”.

Moreover, the first Premiss, besides being superfluous, is actually contained in the second; since it is equivalent to “Some rainy days exist”, which, as we know, is implied in the Proposition “All rainy days are tiresome”.

Altogether, a most unsatisfactory Pair of Premisses!

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      ---------------

    | 0    |      |

    |    ---|---    |

    |  | 1 |  |  |

20.  |---|---|---|---|       -------

    |  | 0 | 0 |  |      | 1 |  |

    |    ---|---    |      |---|---|

    | 0    |      |      | 0 |  |

      ---------------       -------
```

Let "things" be Universe; m="medicine";

x="nasty"; y="senna".

All m are x; &there4 All y are x.

All y are m.

i.e. Senna is nasty.

[See remarks on No. 7, p 60.]

```
      ---------------
    |     |     |
    |   ---|---   |
    |  | 0 | 1 |  |
21. |-1-|---|---|---|       -------
    |  | 0 |  |  |     |  | 1 |
    |   ---|---   |     |---|---|
    |     |     |     |  |  |
      ---------------       -------
```

Let "persons" be Universe; m="Jews";

x="rich"; y="Patagonians".

Some m are x; &there4 Some x are y'.

All y are m'.

i.e. Some rich persons are not Patagonians.

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      ---------------
    | 0   |     |
    |   ---|---   |
```

| | - | |

22. |---|---|---|---| -------

| | 0 | 0 | | | | |

| ---|--- | |---|---|

| 0 | | | 0 | |

---------------   -------

Let "creatures" be Universe; m="teetotalers";

x="that like sugar"; y="nightingales".

All m are x; &there4 No y are x'.

No y are m'.

i.e. No nightingales dislike sugar.

| | |

| ---|--- |

| | 0 | 0 | |

23. |-1-|---|---|---| -------

| | 0 | | | | | |

| ---|--- | |---|---|

| | | | | |

```
    ---------------      -------
```

Let "food" be Universe; m="wholesome";

x="muffins"; y="buns".

No x are m;

All y are m.

There is ‘no information’ for the smaller Diagram; so no Conclusion can be drawn.

```
    ---------------
   |     |     |
   |   ---|---   |
   | | 0 | 0 | |
24. |---|---|---|---|      -------
   | | 1 | | |     | | |
   |   ---|---   |     |---|---|
   |     |     |     | 1 | |
    ---------------      -------
```

Let "creatures" be Universe; m="that run well";

x="fat"; y="greyhounds".

No x are m; &there4 Some y are x'.

Some y are m.

i.e. Some greyhounds are not fat.

```
   ---------------
  |     |     |
  |   ---|---   |
  | |  -  | |
25. |-1-|---|---|---|       -------
  | | 0 | 0 |  |     | | |
  |   ---|---   |     |---|---|
  |     |     |     | | |
   ---------------       -------
```

Let "persons" be Universe; m="soldiers";

x="that march"; y="youths".

All m are x;

Some y are m'.

There is ‘no information’ for the smaller Diagram; so no Conclusion can be

drawn.

```
      ---------------
    | 0    |    0 |
    |    ---|---    |
    |  | 0 | 1 |  |
26.  |---|---|---|---|        -------
    |  | 0 |  |  |      | 0 | 1 |
    |    ---|---    |      |---|---|
    | 1    |      |      | 1 |  |
      ---------------        -------
```

Let "food" be Universe; m="sweet";

x="sugar"; y="salt".

All x are m;   &there4   All x are y'.

All y are m'.   All y are x'.

i.e. Sugar is not salt.

Salt is not sugar.

```
   ---------------
 |     |     |
 |   ---|---   |
 | | 1 | 0 | |
27.  |---|---|---|---|      -------
 | | | 0 | |     | 1 | |
 |   ---|---   |     |---|---|
 |     |     |     | | |
   ---------------      -------
```

Let "Things" be Universe; m="eggs";

x="hard-boiled"; y="crackable".

Some m are x; &there4 Some x are y.

No m are y'.

i.e. Some hard-boiled things can be cracked.

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 | 0   |     |
 |   ---|---   |
 | | 0 | 0 | |
28.  |---|---|---|---|      -------
```

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   | | | | |    | 0 | |
   |   ---|---   |     |---|---|
   | 0   |     |     | | |
     ---------------       -------
```

Let "persons" be Universe; m="Jews"; x="that

are in the house"; y="that are in the garden".

No m are x; &there4 No x are y.

No m' are y.

i.e. No persons, that are in the house, are also in

the garden.

```
     ---------------
   | 0   |   0 |
   |   ---|---   |
   | |  -  | |
29.  |---|---|---|---|       -------
   | | | | |    | | |
   |   ---|---   |     |---|---|
   | 1   |   0 |     | 1 | |
```

```
    ---------------        -------
```

Let "Things" be Universe; m="noisy";

x="battles"; y="that may escape notice".

All x are m; &there4 Some x' are y.

All m' are y.

i.e. Some things, that are not battles, may escape notice.

```
    ---------------
  | 0    |      |
  |    ---|---    |
  |  | 0 | 0 |  |
30.  |---|---|---|---|        -------
  |  | 1 |  |  |      | 0 |  |
  |    ---|---    |      |---|---|
  | 0    |      |      | 1 |  |
    ---------------        -------
```

Let "persons" be Universe; m="Jews";

x="mad"; y="Rabbis".

No m are x; &there4 All y are x'.

All y are m.

i.e. All Rabbis are sane.

```
   ---------------
 |     |     |
 |   ---|---   |
 | | 1 |  |  |
31.  |---|---|---|---|       -------
 | | 0 | 0 |  |     | 1 |  |
 |   ---|---   |     |---|---|
 |     |     |     |  |  |
   ---------------       -------
```

Let "Things" be Universe; m="fish";

x="that can swim"; y="skates".

No m are x'; &there4 Some y are x.

Some y are m.

i.e. Some skates can swim.

```
      ---------------
    |     |     |
    |   ---|---   |
    |  | 0 | 0 |  |
32. |---|---|---|---|       -------
    |  | 1 |  |  |     |  |  |
    |   ---|---   |     |---|---|
    |     |     |     | 1 |  |
      ---------------       -------
```

Let "people" be Universe; m="passionate";

x="reasonable"; y="orators".

All m are x'; &there4 Some y are x'.

Some y are m.

i.e. Some orators are unreasonable.

[See remarks on No. 7, p. 60.]

CHAPTER IV.

HIT OR MISS.

Table of Contents

"Thou canst not hit it, hit it, hit it,

Thou canst not hit it, my good man."

---

1. Pain is wearisome; No pain is eagerly wished for.

2. No bald person needs a hair-brush; No lizards have hair.

3. All thoughtless people do mischief; No thoughtful person forgets a promise.

4. I do not like John; Some of my friends like John.

5. No potatoes are pine-apples; All pine-apples are nice.

6. No pins are ambitious; No needles are pins.

7. All my friends have colds; No one can sing who has a cold.

8. All these dishes are well-cooked; Some dishes are unwholesome if not well-cooked.

9. No medicine is nice; Senna is a medicine.

10. Some oysters are silent; No silent creatures are amusing.

11. All wise men walk on their feet; All unwise men walk on their hands.

12. “Mind your own business; This quarrel is no business of yours.”

13. No bridges are made of sugar; Some bridges are picturesque.

14. No riddles interest me that can be solved; All these riddles are insoluble.

15. John is industrious; All industrious people are happy.

16. No frogs write books; Some people use ink in writing books.

17. No pokers are soft; All pillows are soft.

18. No antelope is ungraceful; Graceful animals delight the eye.

19. Some uncles are ungenerous; All merchants are generous.

20. No unhappy people chuckle; No happy people groan.

21. Audible music causes vibration in the air; Inaudible music is not worth paying for.

22. He gave me five pounds; I was delighted.

23. No old Jews are fat millers; All my friends are old millers.

24. Flour is good for food; Oatmeal is a kind of flour.

25. Some dreams are terrible; No lambs are terrible.

26. No rich man begs in the street; All who are not rich should keep accounts.

27. No thieves are honest; Some dishonest people are found out.

28. All wasps are unfriendly; All puppies are friendly.

29. All improbable stories are doubted; None of these stories are probable.

30. “He told me you had gone away.” “He never says one word of truth.”

31. His songs never last an hour; A song, that lasts an hour, is tedious.

32. No bride-cakes are wholesome; Unwholesome food should be avoided.

33. No old misers are cheerful; Some old misers are thin.

34. All ducks waddle; Nothing that waddles is graceful.

35. No Professors are ignorant; Some ignorant people are conceited.

36. Toothache is never pleasant; Warmth is never unpleasant.

37. Bores are terrible; You are a bore.

38. Some mountains are insurmountable; All stiles can be surmounted.

39. No Frenchmen like plumpudding; All Englishmen like plumpudding.

40. No idlers win fame; Some painters are not idle.

41. No lobsters are unreasonable; No reasonable creatures expect impossibilities.

42. No kind deed is unlawful; What is lawful may be done without fear.

43. No fossils can be crossed in love; Any oyster may be crossed in love.

44. “This is beyond endurance!” “Well, nothing beyond endurance has ever happened to me.”

45. All uneducated men are shallow; All these students are educated.

46. All my cousins are unjust; No judges are unjust.

47. No country, that has been explored, is infested by dragons; Unexplored countries are fascinating.

48. No misers are generous; Some old men are not generous.

49. A prudent man shuns hyaenas; No banker is imprudent.

50. Some poetry is original; No original work is producible at will.

51. No misers are unselfish; None but misers save egg-shells.

52. All pale people are phlegmatic; No one, who is not pale, looks poetical.

53. All spiders spin webs; Some creatures, that do not spin webs, are savage.

54. None of my cousins are just; All judges are just.

55. John is industrious; No industrious people are unhappy.

56. Umbrellas are useful on a journey; What is useless on a journey should be left behind.

57. Some pillows are soft; No pokers are soft.

58. I am old and lame; No old merchant is a lame gambler.

59. No eventful journey is ever forgotten; Uneventful journeys are not worth writing a book about.

60. Sugar is sweet; Some sweet things are liked by children.

61. Richard is out of temper; No one but Richard can ride that horse.

62. All jokes are meant to amuse; No Act of Parliament is a joke.

63. “I saw it in a newspaper.” “All newspapers tell lies.”

64. No nightmare is pleasant; Unpleasant experiences are not anxiously desired.

65. Prudent travellers carry plenty of small change; Imprudent travellers lose their luggage.

66. All wasps are unfriendly; No puppies are unfriendly.

67. He called here yesterday; He is no friend of mine.

68. No quadrupeds can whistle; Some cats are quadrupeds.

69. No cooked meat is sold by butchers; No uncooked meat is served at dinner.

70. Gold is heavy; Nothing but gold will silence him.

71. Some pigs are wild; There are no pigs that are not fat.

72. No emperors are dentists; All dentists are dreaded by children.

73. All, who are not old, like walking; Neither you nor I are old.

74. All blades are sharp; Some grasses are blades.

75. No dictatorial person is popular; She is dictatorial.

76. Some sweet things are unwholesome; No muffins are sweet.

77. No military men write poetry; No generals are civilians.

78. Bores are dreaded; A bore is never begged to prolong his visit.

79. All owls are satisfactory; Some excuses are unsatisfactory.

80. All my cousins are unjust; All judges are just.

81. Some buns are rich; All buns are nice.

82. No medicine is nice; No pills are unmedicinal.

83. Some lessons are difficult; What is difficult needs attention.

84. No unexpected pleasure annoys me; Your visit is an unexpected pleasure.

85. Caterpillars are not eloquent; Jones is eloquent.

86. Some bald people wear wigs; All your children have hair.

87. All wasps are unfriendly; Unfriendly creatures are always unwelcome.

88. No bankrupts are rich; Some merchants are not bankrupts.

89. Weasels sometimes sleep; All animals sometimes sleep.

90. Ill-managed concerns are unprofitable; Railways are never ill-managed.

91. Everybody has seen a pig; Nobody admires a pig.

Extract a Pair of Premisses out of each of the following: and deduce the Conclusion, if there is one:—

92. “The Lion, as any one can tell you who has been chased by them as often as I have, is a very savage animal: and there are certain individuals among them, though I will not guarantee it as a general law, who do not drink coffee.”

93. “It was most absurd of you to offer it! You might have known, if you had had any sense, that no old sailors ever like gruel!”

“But I thought, as he was an uncle of yours—”

“An uncle of mine, indeed! Stuff!”

“You may call it stuff, if you like. All I know is, MY uncles are all old men: and they like gruel like anything!”

“Well, then YOUR uncles are—”

94. “Do come away! I can’t stand this squeezing any more. No crowded shops are comfortable, you know very well.”

“Well, who expects to be comfortable, out shopping?”

“Why, I do, of course! And I’m sure there are some shops, further down the street, that are not crowded. So—”

95. “They say no doctors are metaphysical organists: and that lets me into a little fact about YOU, you know.”

“Why, how do you make THAT out? You never heard me play the organ.”

“No, doctor, but I’ve heard you talk about Browning’s poetry: and that showed me that you’re METAPHYSICAL, at any rate. So—”

Extract a Syllogism out of each of the following: and test its correctness:—

96. “Don’t talk to me! I’ve known more rich merchants than you have: and I can tell you not ONE of them was ever an old miser since the world began!”

“And what has that got to do with old Mr. Brown?”

“Why, isn’t he very rich?”

“Yes, of course he is. And what then?”

“Why, don’t you see that it’s absurd to call him a miserly merchant? Either he’s not a merchant, or he’s not a miser!”

97. “It IS so kind of you to enquire! I’m really feeling a great deal better to-day.”

“And is it Nature, or Art, that is to have the credit of this happy change?”

“Art, I think. The Doctor has given me some of that patent medicine of his.”

“Well, I’ll never call him a humbug again. There’s SOMEBODY, at any rate, that feels better after taking his medicine!”

98. “No, I don’t like you one bit. And I’ll go and play with my doll. DOLLS are never unkind.”

“So you like a doll better than a cousin? Oh you little silly!”

“Of course I do! COUSINS are never kind—at least no cousins I’ve ever seen.”

“Well, and what does THAT prove, I’d like to know! If you mean that cousins aren’t dolls, who ever said they were?”

99. “What are you talking about geraniums for? You can’t tell one flower from another, at this distance! I grant you they’re all RED flowers: it doesn’t need a telescope to know THAT.”

“Well, some geraniums are red, aren’t they?”

“I don’t deny it. And what then? I suppose you’ll be telling me some of those flowers are geraniums!”

“Of course that’s what I should tell you, if you’d the sense to follow an argument! But what’s the good of proving anything to YOU, I should like to know?”

100. “Boys, you’ve passed a fairly good examination, all things considered. Now let me give you a word of advice before I go. Remember that all, who are really anxious to learn, work HARD.”

“I thank you, Sir, in the name of my scholars! And proud am I to think there are SOME of them, at least, that are really ANXIOUS to learn.”

“Very glad to hear it: and how do you make it out to be so?”

“Why, Sir, I know how hard they work—some of them, that is. Who should know better?”

Extract from the following speech a series of Syllogisms, or arguments having the form of Syllogisms: and test their correctness.

It is supposed to be spoken by a fond mother, in answer to a friend’s cautious suggestion that she is perhaps a LITTLE overdoing it, in the way of lessons, with her children.

101. “Well, they’ve got their own way to make in the world. WE can’t leave them a fortune apiece. And money’s not to be had, as YOU know, without money’s worth: they must WORK if they want to live. And how are they to work, if they don’t know anything? Take my word for it, there’s no place for ignorance in THESE times! And all authorities agree that the time to learn is when you’re young. One’s got no memory afterwards, worth speaking of. A child will learn more in an hour than a grown man in five. So those, that have to learn, must learn when they’re young, if ever they’re to learn at all. Of course that doesn’t do unless children are HEALTHY: I quite allow THAT. Well, the doctor tells me no children are healthy unless they’ve got a good colour in their

cheeks. And only just look at my darlings! Why, their cheeks bloom like peonies! Well, now, they tell me that, to keep children in health, you should never give them more than six hours altogether at lessons in the day, and at least two half-holidays in the week. And that's EXACTLY our plan I can assure you! We never go beyond six hours, and every Wednesday and Saturday, as ever is, not one syllable of lessons do they do after their one o'clock dinner! So how you can imagine I'm running any risk in the education of my precious pets is more than I can understand, I promise you!"

THE END.

FEEDING THE MIND

Main TOC

NOTE

The history of this little sparkle from the pen of Lewis Carroll may soon be told. It was in October of the year 1884 that he came on a visit to a certain vicarage in Derbyshire, where he had promised, on the score of friendship, to do what was for him a most unusual favour—to give a lecture before a public audience.

The writer well remembers his nervous, highly-strung manner as he stood before the little room full of simple people, few of whom had any idea of the world-wide reputation of that shy, slight figure before them.

When the lecture was over, he handed the manuscript to me, saying: 'Do what you like with it.'

The one for whose sake he did this kindness was not long after called

'Into the Silent Land.'

So the beautifully-written MS., in his customary violet ink, has been treasured for more than twenty years, only now and then being read over at Christmastime to a friend or two by the study fire, always to meet with the same welcome and glad acknowledgment that here was a genuine, though little flame that could not have belonged to any other source but that which all the world knew in Alice in Wonderland and Through the Looking-Glass.

There may be, perhaps, many others who, gathering round a winter fire, will be glad to read words, however few, from that bright source, and whose memories will respond to the fresh touch of that cherished name.

It remains to add but one or two more associations that cling to it and make the remembrance more vivid still. While Lewis Carroll was staying in the house, there came to call a certain genial and by no means shy Dean, who, without realizing what he was doing, proceeded, in the presence of other callers, to make

some remark identifying Mr. Dodgson as the author of his books.

There followed an immense explosion immediately on the visitor's departure, with a pathetic and serious request that, if there were any risk of a repetition of the call, due warning might be given, and the retreat secured.

Probably not many readers of the immortal Alice have ever seen the curious little whimsical paper called

EIGHT OR NINE WISE WORDS

ABOUT

LETTER-WRITING

which their author had printed and used to send to his acquaintance, accompanied by a small case for postage-stamps.

It consists of forty pages, and is published by Emberlin and Son, Oxford; and these are the contents:

PAGE

In this little script, also, there are the same sparkles of wit which betoken that nimble pen, as, for example, under 'How to begin a Letter':

'"And never, never, dear madam" (N.B.—This remark is addressed to ladies only. No man would ever do such a thing), "put 'Wednesday' simply as the date! "That way madness lies!"'

From section 3: 'How to go on with a Letter.'—'A great deal of the bad writing in the world comes simply from writing too quickly. Of course you reply, "I do it to save time." A very good object, no doubt, but what right have you to do it at your friend's expense? Isn't his time as valuable as yours? Years ago I used to receive letters from a friend—and very interesting letters too—written in one of the most atrocious hands ever invented. It generally took me about a week to read one of his letters! I used to carry it about in my pocket and take it out at leisure times, to puzzle over the riddles which composed it—holding it in different positions and at different distances, till at last the meaning of some hopeless scrawl would flash upon me, when I at once wrote down the English under it. And when several had been thus guessed the context would help one with the others, till at last the whole series of hieroglyphics was deciphered. If all one's friends wrote like that, life would be entirely spent in reading their letters!'

Rule for correspondence that has, unfortunately, become controversial.

'Don't repeat yourself.—When once you have had your say fully and clearly on a certain point, and have failed to convince your friend, drop that subject. To repeat your arguments all over again, will simply lead to his doing the same, and so you will go on like a circulating decimal. Did you ever know a circulating

decimal come to an end?’

Rule 5.—‘If your friend makes a severe remark, either leave it unnoticed, or make your reply distinctly less severe; and if he makes a friendly remark, tending towards making up the little difference that has arisen between you, let your reply be distinctly more friendly.

‘If, in picking a quarrel, each party declined to go more than three-eighths of the way, and if in making friends, each was ready to go five-eighths of the way—why, there would be more reconciliations than quarrels! Which is like the Irishman’s remonstrance to his gad-about daughter: “Shure, you’re always goin’ out! You go out three times for wanst that you come in!”’

Rule 6.—‘Don’t try to get the last word…. (N.B.—If you are a gentleman and your friend a lady, this rule is superfluous: You won’t get the last word!)’

Let the last word to-day be part of another rule, which gives a glimpse into that gentle heart:

‘When you have written a letter that you feel may possibly irritate your friend, however necessary you may have felt it to so express yourself, put it aside till the next day. Then read it over again, and fancy it addressed to yourself. This will often lead to your writing it all over again, taking out a lot of the vinegar and pepper and putting in honey instead, and thus making a much more palatable dish of it!’

‘Quis desiderio sit pudor aut modus

Tam cari capitis?’

W. H. D.

November 1907.

Breakfast, dinner, tea; in extreme cases, breakfast, luncheon, dinner, tea, supper, and a glass of something hot at bedtime. What care we take about feeding the lucky body! Which of us does as much for his mind? And what causes the difference? Is the body so much the more important of the two?

By no means: but life depends on the body being fed, whereas we can continue to exist as animals (scarcely as men) though the mind be utterly starved and neglected. Therefore Nature provides that, in case of serious neglect of the body, such terrible consequences of discomfort and pain shall ensue, as will soon bring us back to a sense of our duty: and some of the functions necessary to life she does for us altogether, leaving us no choice in the matter. It would fare but ill with many of us if we were left to superintend our own digestion and circulation. 'Bless me!' one would cry, 'I forgot to wind up my heart this morning! To think that it has been standing still for the last three hours!' 'I can't walk with you this afternoon,' a friend would say, 'as I have no less than eleven dinners to digest. I had to let them stand over from last week, being so busy, and my doctor says he will not answer for the consequences if I wait any longer!'

Well, it is, I say, for us that the consequences of neglecting the body can be clearly seen and felt; and it might be well for some if the mind were equally visible and tangible—if we could take it, say, to the doctor, and have its pulse felt.

'Why, what have you been doing with this mind lately? How have you fed it? It looks pale, and the pulse is very slow.'

'Well, doctor, it has not had much regular food lately. I gave it a lot of sugar-plums yesterday.'

'Sugar-plums! What kind?'

'Well, they were a parcel of conundrums, sir.'

'Ah, I thought so. Now just mind this: if you go on playing tricks like that, you'll spoil all its teeth, and get laid up with mental indigestion. You must have nothing but the plainest reading for the next few days. Take care now! No novels on any account!'

Considering the amount of painful experience many of us have had in feeding and dosing the body, it would, I think, be quite worth our while to try and translate some of the rules into corresponding ones for the mind.

First, then, we should set ourselves to provide for our mind its proper kind of food. We very soon learn what will, and what will not, agree with the body, and find little difficulty in refusing a piece of the tempting pudding or pie which is associated in our memory with that terrible attack of indigestion, and whose very name irresistibly recalls rhubarb and magnesia; but it takes a great many lessons to convince us how indigestible some of our favourite lines of reading are, and again and again we make a meal of the unwholesome novel, sure to be followed by its usual train of low spirits, unwillingness to work, weariness of existence—in fact, by mental nightmare.

Then we should be careful to provide this wholesome food in proper amount. Mental gluttony, or over-reading, is a dangerous propensity, tending to weakness of digestive power, and in some cases to loss of appetite: we know that bread is a good and wholesome food, but who would like to try the experiment of eating two or three loaves at a sitting?

I have heard a physician telling his patient—whose complaint was merely gluttony and want of exercise—that 'the earliest symptom of hyper-nutrition is a deposition of adipose tissue,' and no doubt the fine long words greatly consoled the poor man under his increasing load of fat.

I wonder if there is such a thing in nature as a FAT MIND? I really think I have met with one or two: minds which could not keep up with the slowest trot in conversation; could not jump over a logical fence, to save their lives; always got stuck fast in a narrow argument; and, in short, were fit for nothing but to waddle helplessly through the world.

Then, again, though the food be wholesome and in proper amount, we know that we must not consume too many kinds at once. Take the thirsty a quart of beer, or a quart of cider, or even a quart of cold tea, and he will probably thank you (though not so heartily in the last case!). But what think you his feelings would be if you offered him a tray containing a little mug of beer, a little mug of cider, another of cold tea, one of hot tea, one of coffee, one of cocoa, and

corresponding vessels of milk, water, brandy-and-water, and butter-milk? The sum total might be a quart, but would it be the same thing to the haymaker?

Having settled the proper kind, amount, and variety of our mental food, it remains that we should be careful to allow proper intervals between meal and meal, and not swallow the food hastily without mastication, so that it may be thoroughly digested; both which rules, for the body, are also applicable at once to the mind.

First, as to the intervals: these are as really necessary as they are for the body, with this difference only, that while the body requires three or four hours' rest before it is ready for another meal, the mind will in many cases do with three or four minutes. I believe that the interval required is much shorter than is generally supposed, and from personal experience, I would recommend anyone, who has to devote several hours together to one subject of thought, to try the effect of such a break, say once an hour, leaving off for five minutes only each time, but taking care to throw the mind absolutely 'out of gear' for those five minutes, and to turn it entirely to other subjects. It is astonishing what an amount of impetus and elasticity the mind recovers during those short periods of rest.

And then, as to the mastication of the food, the mental process answering to this is simply thinking over what we read. This is a very much greater exertion of mind than the mere passive taking in the contents of our Author. So much greater an exertion is it, that, as Coleridge says, the mind often 'angrily refuses' to put itself to such trouble—so much greater, that we are far too apt to neglect it altogether, and go on pouring in fresh food on the top of the undigested masses already lying there, till the unfortunate mind is fairly swamped under the flood. But the greater the exertion the more valuable, we may be sure, is the effect. One hour of steady thinking over a subject (a solitary walk is as good an opportunity for the process as any other) is worth two or three of reading only. And just consider another effect of this thorough digestion of the books we read; I mean the arranging and 'ticketing,' so to speak, of the subjects in our minds, so that we can readily refer to them when we want them. Sam Slick tells us that he has learnt several languages in his life, but somehow 'couldn't keep the parcels sorted' in his mind. And many a mind that hurries through book after book, without waiting to digest or arrange anything, gets into that sort of condition, and the unfortunate owner finds himself far from fit really to support the

character all his friends give him.

‘A thoroughly well-read man. Just you try him in any subject, now. You can’t puzzle him.’

You turn to the thoroughly well-read man. You ask him a question, say, in English history (he is understood to have just finished reading Macaulay). He smiles good-naturedly, tries to look as if he knew all about it, and proceeds to dive into his mind for the answer. Up comes a handful of very promising facts, but on examination they turn out to belong to the wrong century, and are pitched in again. A second haul brings up a fact much more like the real thing, but, unfortunately, along with it comes a tangle of other things—a fact in political economy, a rule in arithmetic, the ages of his brother’s children, and a stanza of Gray’s ‘Elegy,’ and among all these, the fact he wants has got hopelessly twisted up and entangled. Meanwhile, every one is waiting for his reply, and, as the silence is getting more and more awkward, our well-read friend has to stammer out some half-answer at last, not nearly so clear or so satisfactory as an ordinary schoolboy would have given. And all this for want of making up his knowledge into proper bundles and ticketing them.

Do you know the unfortunate victim of ill-judged mental feeding when you see him? Can you doubt him? Look at him drearily wandering round a reading-room, tasting dish after dish—we beg his pardon, book after book—keeping to none. First a mouthful of novel; but no, faugh! he has had nothing but that to eat for the last week, and is quite tired of the taste. Then a slice of science; but you know at once what the result of that will be—ah, of course, much too tough for his teeth. And so on through the whole weary round, which he tried (and failed in) yesterday, and will probably try and fail in to-morrow.

Mr. Oliver Wendell Holmes, in his very amusing book, ‘The Professor at the Breakfast Table,’ gives the following rule for knowing whether a human being is young or old: ‘The crucial experiment is this—offer a bulky bun to the suspected individual just ten minutes before dinner. If this is easily accepted and devoured, the fact of youth is established.’ He tells us that a human being, ‘if young, will eat anything at any hour of the day or night.’

To ascertain the healthiness of the mental appetite of a human animal, place in its hands a short, well-written, but not exciting treatise on some popular subject—a mental bun, in fact. If it is read with eager interest and perfect attention, and if

the reader can answer questions on the subject afterwards, the mind is in first-rate working order. If it be politely laid down again, or perhaps lounged over for a few minutes, and then, ‘I can’t read this stupid book! Would you hand me the second volume of “The Mysterious Murder”?’ you may be equally sure that there is something wrong in the mental digestion.

If this paper has given you any useful hints on the important subject of reading, and made you see that it is one’s duty no less than one’s interest to ‘read, mark, learn, and inwardly digest’ the good books that fall in your way, its purpose will be fulfilled.